WESTERN GAS

December
1925

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Holiday Displays of This Type Will Promote Wider Use of Gas Through Increased Sales of Appliances

DEC 1925
PENNSYLVANIA

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

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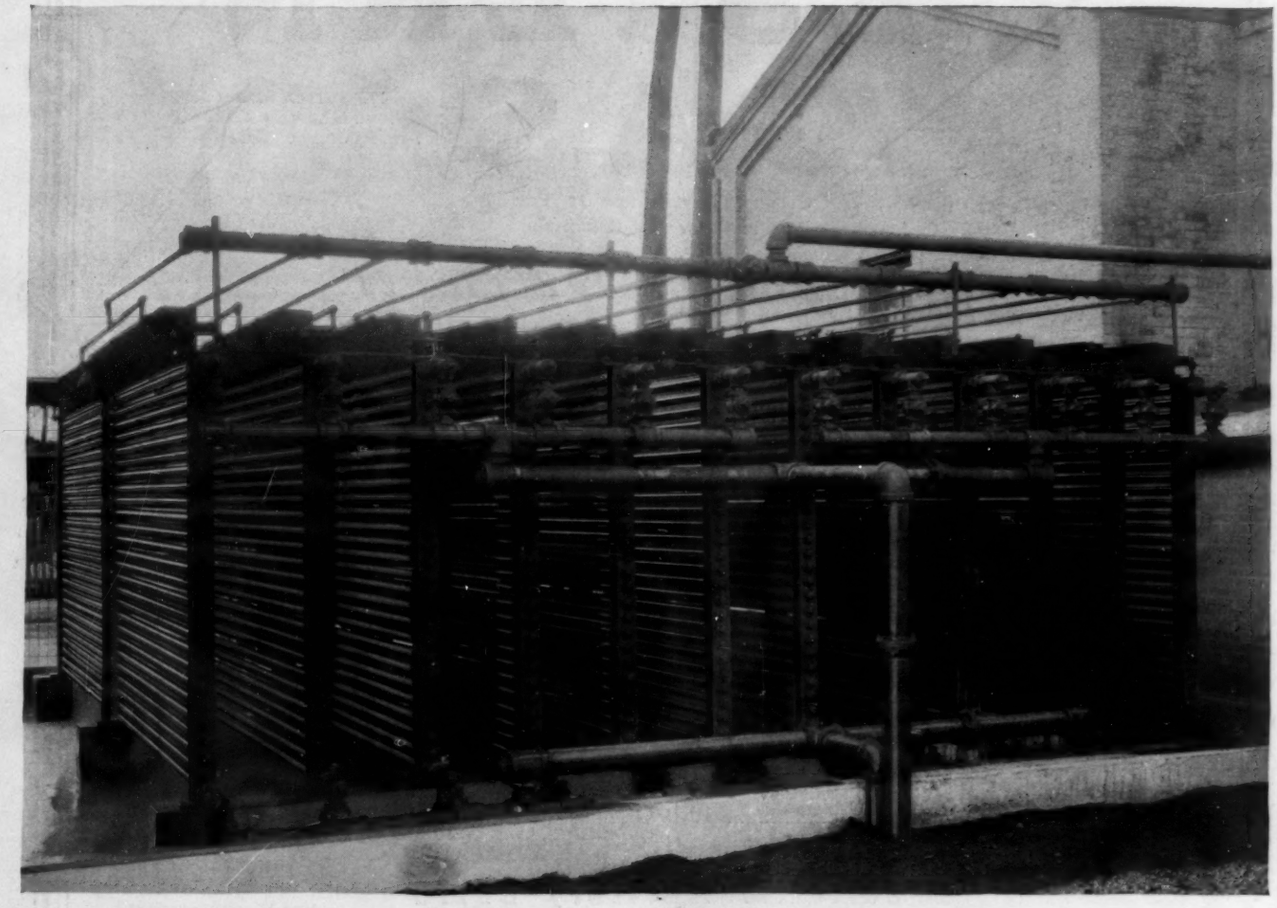

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Official Publication Of The
Pacific Coast Gas Association

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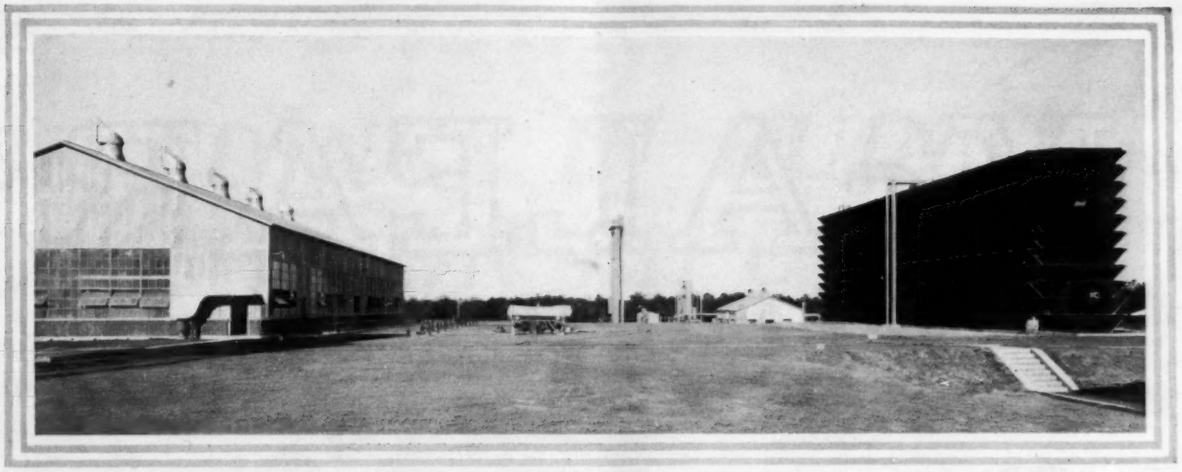


Compressor house and Braun gas coolers, absorption plant, and cooling tower.

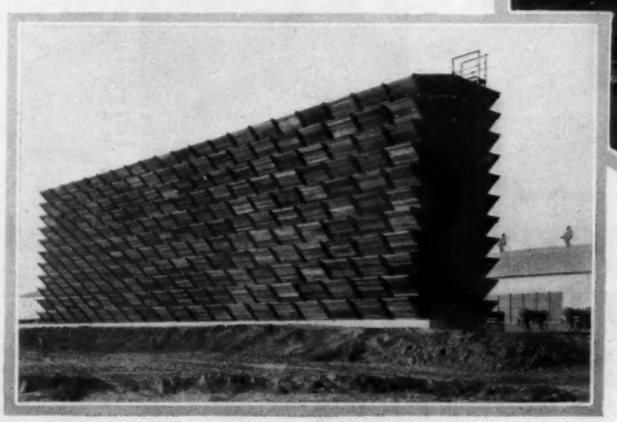
Saving . . . . with Braun Coolers

GAS COOLING in open or submerged pipe coils is fast becoming obsolete. A pipe coil installation had been decided upon for the compressor plant shown in the photograph, but the gas engine manufacturer suggested investigating Braun coolers.

The suggestion was acted upon, with the result that Braun coolers and other apparatus were installed. The performance of the cooler group and the savings effected are listed below:

Performance Data

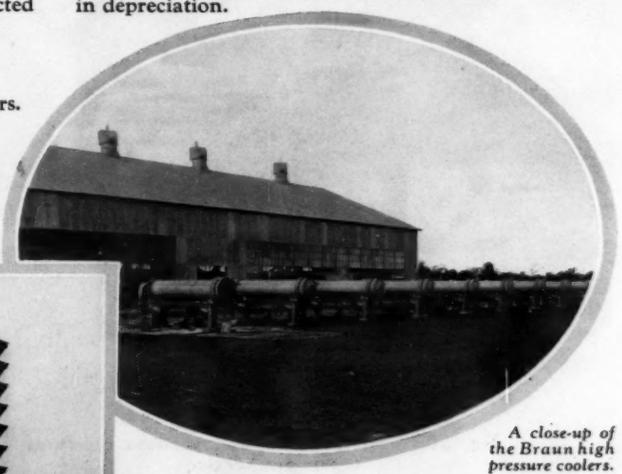
Quantity of gas cooled	60,000,000 cu. ft. per 24 hrs.
Working pressure	450 lbs. per sq. in.
Initial temperature	220° F.
Final temperature	80° F.
Cooling water	75° F.
Pressure drop of gas	1 lb. per sq. in.



Braun cooling tower installed in connection with high pressure coolers.

Savings

1. Approximately $5,000 was saved in first cost.
2. Miscellaneous savings were effected, such as, (a) pipe lines and fittings simplified; (b) engineering expense and time for installation reduced; (c) cost of field labor and transportation minimized.
3. At least $2,500 is saved annually on the difference in depreciation.



A close-up of the Braun high pressure coolers.

4. Operating costs are extremely low as no maintenance is required other than periodic cleaning.

Your problem may be of a different nature from the one we have discussed, yet you may place it in the hands of the Braun engineers with every confidence that its solution will be as satisfactory and economical.

Write for Bulletin 118.

C. F. Braun & Co.

Manufacturing Mechanical Engineers

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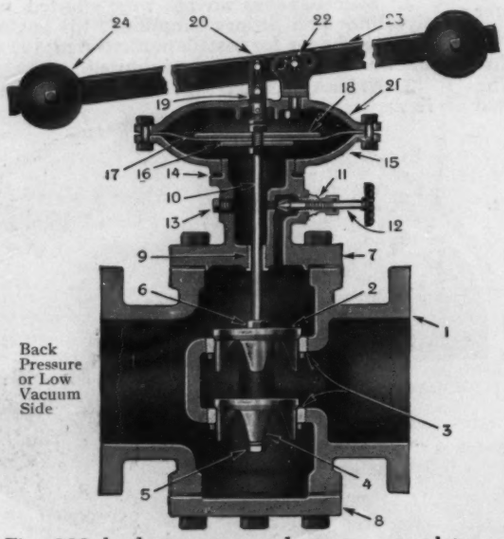

Fig. 300 back pressure and vacuum regulator for gas service

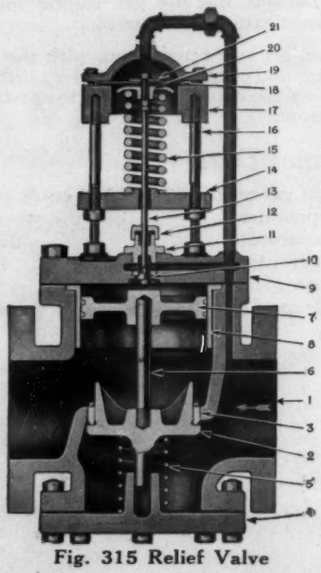

Fig. 315 Relief Valve

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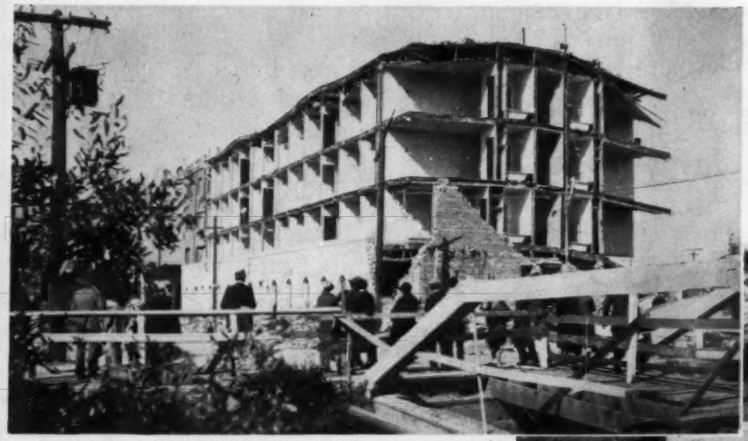
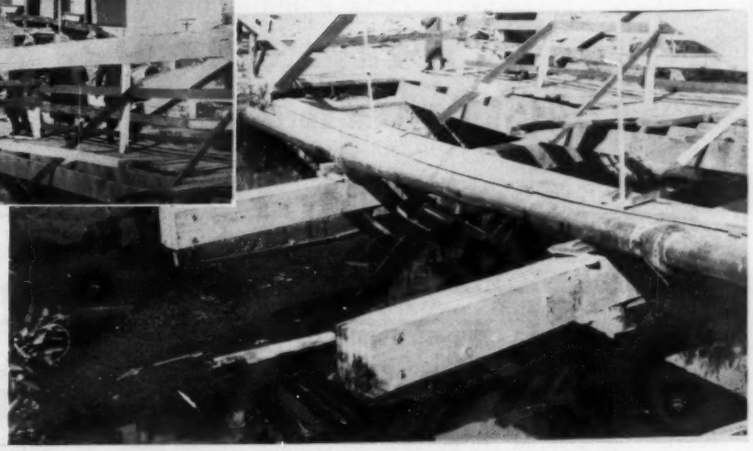
BUILDINGS IN RUINS..... CAST IRON PIPE INTACT



"It is interesting to note that cast iron pipe was not injured in the least by the earthquake."

—From a report by Clyde H. Potter, Southern Counties Gas Company, writing on the effect of the Santa Barbara shock on the gas mains of the city.



Following the quake that rocked the city of Santa Barbara, engineers were prepared to find both gas and water distribution systems at least partially wrecked, but here is what investigation disclosed:

Of over 50 breaks in the gas mains, not one was in the cast iron pipe lines.

There were but two breaks in the cast iron water mains—both minor in nature and easily repaired in a short time.

Even under extreme conditions—

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Christmas ---1779 and 1925

The following extract from a New England diary written in the year 1779, while the thirteen Colonies were still at war with England, should interest every individual connected withthe Gas Industry:

"This year it was Uncle Simeon's turn to have the dinner at his house, but of course we all helped them as they did help us when it was our turn and there is always enough for all to do.

"All the baking of pies and cakes was done at our house and we had the big oven heated and filled twice each day for three days before it was all done. Everything was good, though we did have to do without some things that ought to be used.

"Of course, we could have no roast beef. None of us had tasted beef this three years back, as it must all go to the Continental Army, and too little they get, poor fellows.

"The day was bitter cold and when we got home from meeting we were glad enough of the fire in Uncle's dining hall, but by the time the dinner was one-half over, those of us who were on the fire side of one table were forced to get up and carry our plates with us around to the far side of the other table, while those who had set there were as glad to bring their plates around to the fire side to get warm. All but the old ladies who had a screen put behind their chairs.

"We did not rise from the table until it was quite dark and then when the dishes had been cleared away we all got around the fire as close as we could, cracked nuts, sang songs and told stories."

The story of a typical New England Christmas dinner 146 years ago.

The Gas Industry during succeeding years eliminated the drudgery formerly considered a necessary part of the holiday feast. Instead of cooking three and four days prior to Christmas the housewife of today, thanks to this great industry, may place her food in the oven on Christmas morning, knowing that it will be done thoroughly at the appointed hour.

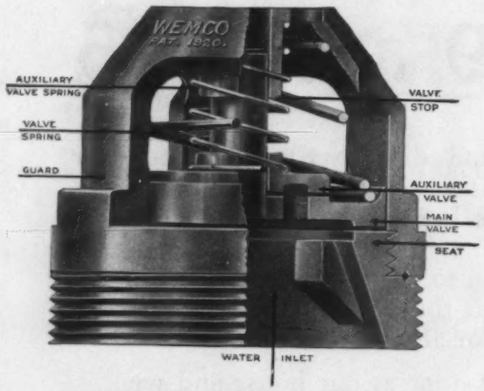
Gas Heat, at the turn of a valve, today cheers the guests with comforting warmth. No half-frozen friends on one side of the table and over-heated diners across from them. An evenly distributed Gas Heat makes for health, happiness and a thoroughly enjoyable Christmas.

Such is our contribution to the Christmas of 1925.

Southern Counties Gas Company

Los Angeles, California

Anticipate Next Year's Load–



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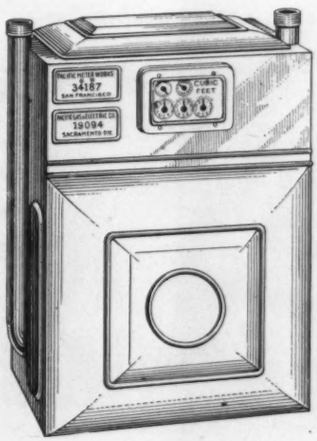

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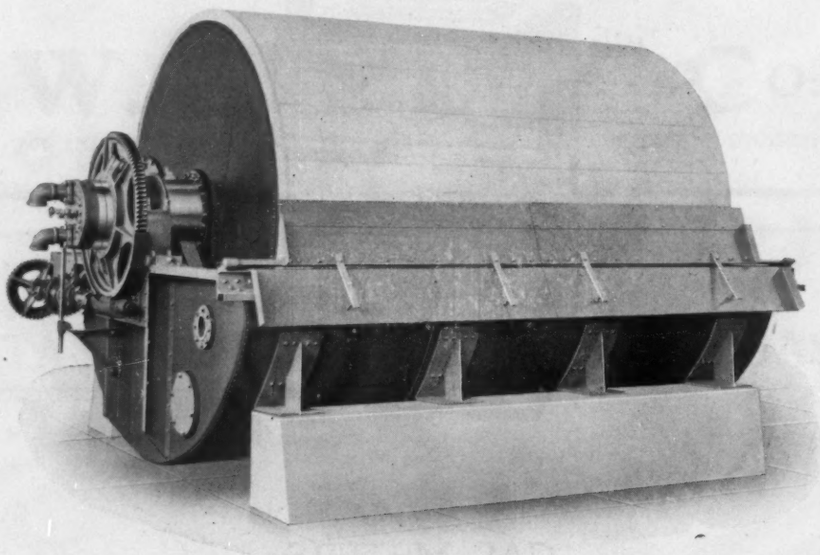

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WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in the *Eleven Western States*

A School *for the* Appliance Man

The Gas Appliance Association of Southern California Inaugurates a 15-Lesson Gas Appliance Course, under Auspices of Extension Department of State University

By GEORGE H. FINLEY

FOR some years gas companies have been availing themselves of the possibilities that lie in formal gas education, conducting courses of various kinds designed to give employees a broad understanding of the industry in which they labor, and calculated to stimulate them to work for increased efficiency.

Hitherto little in this line has been attempted in the gas appliance field, due partly to the lack of organization which until very recently has existed among members of the manufacturing, distributing and retail gas appliance industry. Individual employers have appreciated the need, but have found it impossible alone to put within reach of their employees courses which are broad in scope and at the same time practical in nature.

Now, in Los Angeles, comes the announcement from the Gas Appliance Association of Southern California that a complete course, organized under expert direction and presented in a series of weekly lessons, is to be made available to its members. This is indeed breaking virgin ground, but the Association has planned its steps with care, to the end that the undertaking may meet the vital need for which it was designed—the promotion of a real knowledge of gas and gas appliances among those who sell the public. The prospectus which has been given out by Geo. Finney, secretary of the Association, indicates that the subject of selection, use and sale of gas appliances is to be covered thoroughly, and those who enroll for the course and "follow through," should gain some new and sharper sales weapons to use in the cause of "more and better gas appliances."

The course is to be presented under the auspices of the extension division of the University of California, in 15 consecutive weekly meetings, beginning shortly after the first of the year. Walter M. Berry, executive engineer for the California Gas Research Council, will have general direction of the course as the instructor in charge, and will be assisted by more than 20 speakers on special subjects during the sessions. Mr. Berry, whose qualifications have been recognized in his selection by the University to conduct the course, comes to this task from an unusually complete background of experience in the gas industry. He has had the practical contacts gained from work in gas utilities, serving as chemist and laboratory director for the Portland Gas and Coke Company. As head of the gas engineering division of the Bureau of Standards he spent seven years on problems relating to gas service standards, and in directing that body's research and testing activities in the field of gas appliances. For the last two years Mr. Berry has headed the research work of the California Gas Research Council, which is composed of the larger gas utilities in California. In his term of service with the Council many contributions have been made to the western industry. The Association feels that the choice of director for the forthcoming instruction has been a happy one.

Walter M. Berry *Geo. Finney*

As planned at present the enrollment will be limited to 150 students, all of whom must be members of the Gas Appliance Association. This latter provision is stipulated by the University extension department, since the Association is sponsoring the course. This limited enrollment has already been taken up, according to Mr. Finney, most of the reservations having been made by heads of firms holding membership in the Association. That the need for the instruction was strongly felt is seen in the numerous reservations made for salesmen and other employees within a single firm. One radiator manufacturer placed his request for 20 reservations, a gas company signed for five, a hardware dealer for eight, a furniture retailer for eight, a gas appliance firm for 12, and so on. Heads of firms are registering personally for the courses, as well as for enrolling their employees, which would seem to indicate a healthy recognition of possibilities for improvement in the appliance industry, from the top down.

Now that the full enrollment has been recruited requests are being received from other communities that similar courses be conducted locally. Fullerton and Long Beach, both within a 30-mile radius of Los Angeles, have both indicated a desire for the course.

A $10 fee, plus the actual cost of printing the subject matter of the course, will be the sole cost to individuals regis-

tering for the 30 hours of instruction. The lectures are to be mimeographed in advance and distributed among the students a week before the class session at which they are presented. It is believed that this plan will make it possible for the discussion following the lecture to be entered into intelligently by everyone.

A Practical Course

Practicality is the aim of those in charge of the preparation of the course. Treatment of topics will be non-technical wherever possible and the lectures in many cases will be built around or supplemented by physical demonstrations, involving the taking down of appliances to study structure, etc. Lantern slides are being prepared to illustrate many of the lectures, such as those on window display. Various phases of appliance retailing will be outlined by men recognized as leaders in that field. Problems of selling, display, advertising, store records and costs will all come in for a share of expert attention. The lectures will be devoted entirely to subject matter that has general appeal. No advertising of any kind will be introduced by manufacturers or representatives of separate appliance lines.

One primary consideration will be to promote a real understanding of conditions which govern gas service, both from a gas manufacture and gas distribution angle.

To Take Field Trips

At least three field trips will be taken by students in this newest of gas courses. The gas plant of the Los Angeles Gas and Electric Corporation will be visited; the process of making stove castings will be studied at first hand through the courtesy of the Western Stove Company of Culver City; the Smoot-Holman Enameling plant of Inglewood will afford an opportunity to learn something of porcelain enameling. Each of the trips will be scheduled to tie in with the lecture to which it pertains.

From the following outline of the topics which will be developed during the 15 lesson periods, and the accompanying announcement of speakers, can be judged the scope and thoroughness of the instruction which is to be offered.

Outline of Course of 15 Lectures on Selection, Use, and Sale of Gas Appliances for Wholesale and Retail Furniture and Hardware Dealers, Gas Appliance Men, and Plumbers

Lecture No. 1—Manufacture and Distribution of Gas

Discovery of gas, early uses, utility company problems, peak loads, pressure, qualities, piping rust, meter governors. Walter M. Berry; W. M. Henderson, Los Angeles Gas and Electric Corporation.

Lecture No. 2—Combustion of Gas

Combustion of different kinds of gas, primary and secondary air requirements, orifice capacities, adjustable orifice and air shutter, port areas, burner design. Walter M. Berry.

Lecture No. 3—Space Heating

Construction and Operation of Radiant Type Heaters. P. B. Taylor, C. B. Babcock Company.

BELOW is given the complete list of lecture topics which will comprise the 15-lesson course in gas appliances to be offered soon after the first of the year by the Gas Appliance Association, under the auspices of the University of California, extension division.

Lecture No. 1—Manufacture and distribution of gas.
Lecture No. 2—Combustion of gas.
Lecture No. 3—Space heating: Radiant type heaters; Mantles and clay backs.
Lecture No. 4—Space heating: Gas steam radiators; Portable heaters.
Lecture No. 5—Space heating: Gas furnaces; Air radiators.
Lecture No. 6—(a) Ventilation; (b) Water heating.
Lecture No. 7—Gas ranges: Selection; Connection, adjustment, repair, etc.
Lecture No. 8—Gas ranges: Enamel.
Lecture No. 9—Gas ranges: Oven heat regulators.
Lecture No. 10—Costs and profits: How to make a profit; Cost of selling a range.
Lecture No. 11—Records and follow-up for future sales.
Lecture No. 12—Demonstrations, selling and cooking schools.
Lecture No. 13—Store displays and window trims.
Lecture No. 14—Advertising, newspaper and billboard.
Lecture No. 15—Salesmanship: How not to sell a gas range; How to sell a gas range.

Construction of Mantles and Clay Backs. Geo. Finney, Gas Appliance Association.

Lecture No. 4—Space Heating

Gas Steam Radiators. E. A. Jones, Williams Radiator Company.

Portable Heaters. J. Graham Hambly, Graham Hambly & Sons.

Lecture No. 5—Space Heating

Gas Furnaces. Jesse Martin, Phillips Heating Company.

Air Radiators. Ross Munro, Potter Radiator Company.

Lecture No. 6

(a) Ventilation. F. J. Schafer, General Manager Southern California Gas Company.

(b) Water Heating. Walter M. Berry.

Lecture No. 7—Gas Ranges

Selection of a Gas Range. Frank Bivens, Southern Counties Gas Company.

Connection and placing, burner adjustment and ailments, condensation, circulation, leaks, vent connections, kitchen heater ranges, repairs and replacements. G. R. Kendall, Northwest Gas & Electric Equipment Company.

Gas Savers and Accessories, Walter M. Berry.

Lecture No. 8—Gas Ranges

Application, Uses and Care of Enamel. C. E. Smoot, Smoot-Holman Company.

Lecture No. 9—Gas Ranges—Oven Heat Regulators

Robertshaw Regulator. Geo. Finney, Gas Appliance Association.

Lorain Regulator. G. H. Wright, General Sales Corporation.

Wilcolator Regulator. H. R. Mayer, Tappan Stove Company.

Claus Regulator. D. P. O'Keefe, O'Keefe & Merritt Company.

Standard Heat Control. G. R. Kendall, Northwest Gas & Electric Equipment Company.

Lecture No. 10—Costs and Profits

How to Make a Profit. Ray Logue, Beacon Light Company.

Cost of Selling a Range. Fred Forrest, Forrest Stove Works.

Lecture No. 11—Records and Follow-up for Future Sales

Geo. Finney, Gas Appliance Association. E. S. Hoyt, Hoyt Heater Company.

Lecture No. 12—Demonstrations, Selling and Cooking Schools

Demonstrations and Selling. A. F. Rice, Cribben & Sexton Company.

Cooking Schools. G. H. Wright, General Sales Corporation.

Lecture No. 13—Store Displays and Window Trims

Store Displays. H. R. Mayer, Tappan Stove Company.

Window Trims. Courtesy of *Western Gas.*

Lecture No. 14—Advertising, Newspaper and Billboard

Donald E. Forker, Donald E. Forker Company. Chas. Duncan, Foster & Kleiser.

Lecture No. 15—Salesmanship

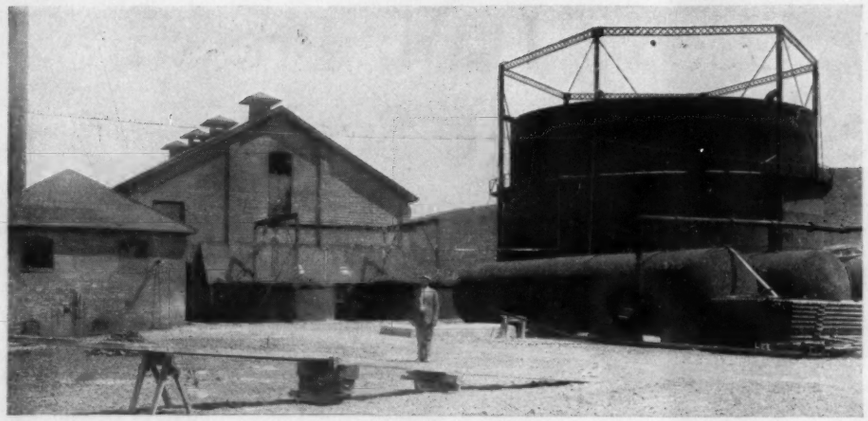
How Not to Sell a Gas Range. Geo. Finney, Gas Appliance Association.

How to Sell a Gas Range. A. F. Rice, Cribben & Sexton Company.

Prizes Offered

The Gas Appliance Association is lending every aid toward making the coming series of lectures of real value. To serve as an extra inducement to those taking the course the Association

(Continued on Page 23)



General View of the Sheridan Gas and Fuel Company's Plant where Experimentation in the Exclusive Use of Lignite for Generation of Gas, Described in Accompanying Article, was Carried to Success

Lignite *as a* Practical Gas-Making Coal

By H. J. Forward

Manager Sheridan Gas and Fuel Company, Sheridan, Wyoming.

THE general impression among gas men who have made a study of production is that lignite coal has no value as a gas coal and that the by-products obtained have no commercial value. About nine years ago a coal gas plant was built in Sheridan, Wyoming, by a civil engineer who had an idea that the lignite coal mined adjacent to the city would make a marketable city gas. Repeated efforts were made to manufacture gas from the Sheridan coal, and finally after successive failures it was abandoned and the company resorted to the use of gas coal shipped from Southern Colorado, a distance of about 900 miles.

Several times during the next few years, when coal shipments were delayed, Sheridan coal was tried, each trial resulting in the city being without gas. Naturally, the people of Sheridan were thoroughly convinced that their coal was unfit for gas making purposes.

Lignite Used Exclusively

When I came to Sheridan in April, 1921, to take over the management of the company, I found that gas coal was costing $1.84 per thousand cubic feet of gas sold. Many changes were made in retort house practice until this cost was reduced to $1.25 per thousand cubic feet of gas sold. We began our experiments with Sheridan coal in February, 1922, the result being that for the year 1922 coal carbonized was reduced to 86 cents per thousand feet of gas sold. The experimental work continued throughout the next two years, and in August, 1924, we found a way to use lignite coal exclusively, not only for gas coal, but for bench fuel as well. This resulted in reducing our coal cost until the item coal carbonized for the first nine months of this current year was 29.9 cents per thousand cubic feet of gas sold, and for the past four months, has averaged 25.5 cents.

It occurs to me that many readers will ask the question, "How about the revenues from coke?" Gas coking coal will yield 1360 pounds of coke per ton of coal carbonized. This coke was worth only $4.50 per ton net to us after delivery—delivery costing $1.25 per ton. Domestic coal sells at from $3.75 to $4.50 per ton delivered in the bin, and we would have great difficulty in selling our output of coke at $5.75 per ton delivered. Our lignite gives us a residual resembling inch and a half screenings except for its weight and lustre, the yield being 800 pounds per ton of coal carbonized. This residual, which we call "breeze" for lack of a better term, is an excellent boiler fuel and sells readily in competition with lignite screenings, netting us about $1.25 per ton.

On account of the distance to market, coal tar is of very little value. We have shipped several carloads of tar and find the price we received was very little more than the cost of freight and pumping. For this reason, we have endeavored to develop a local market for coal tar, and find that it is very much more satisfactory from a sales standpoint. Our yield is seven gallons per ton of coal carbonized, which is three gallons less than the yield from our old gas coal.

Another question that will be asked is, "How can you maintain good heats in the benches with lignite coal?" I must answer this by saying that our heats range from 2,400 to 2,700 degrees Fahrenheit constantly, with no difficulty whatever and at a very reasonable cost. For the first nine months of this year our bench fuel cost was 73 cents per ton of coal carbonized.

During the early part of our experimental work we tried mixing 5 per cent lignite with coking coal and found that the mixture did not affect the gas nor hurt the quality of the coke materially. We then tried a 20 per cent and a 25 per cent mixture without causing any trouble as far as the gas was concerned, but the merchandising value of the coke was ruined. The mixture was then increased to 50 per cent, which still made good gas. There was a noticeable difference, but not enough to cause any trouble. The coke that resulted from this mixture did not form in solid lumps, but crumpled into breeze when drawn from the retorts.

The next step was trying small charges of lignite in the bottom retorts and using coking coal in tops and middles. Following this we tried lignite in

(Continued on Page 28)

"Our Heats Range from 2,400 to 2,700 Degrees Fahrenheit Constantly"

Adopting *the* Use *of* High Pressure Storage *on a* Large Scale

Twelve New Holder Units are Added to the System of Southern Counties Gas Co., Serving Five Communities

ABOUT five years ago, with the erection of a 100,000 cu. ft. capacity high pressure storage holder at Azusa, Calif., the Southern Counties Gas Company began a practical experimentation with high pressure storage. This significant trial has been closely followed by the gas industry of the West and its success is manifest in the announcement that in five other communities on the Company's lines, by January 15, 1926, high pressure storage facilities will be operative. Twelve units have been added to the high pressure storage equipment, four holders being constructed at Santa Ana, three at Orange, two at Sierra Madre, two at Ontario and one at Newport Beach.

The erection of these holders marks the adoption of the high pressure storage principle throughout the Southern Counties system. Storage units will be added in other load centers as developments warrant, according to A. F. Bridge and M. R. Thompson, engineers for the Company. Messrs. Thompson and Bridge are responsible for the development of the present flexible plan for installation of storage units on the Southern Counties' lines.

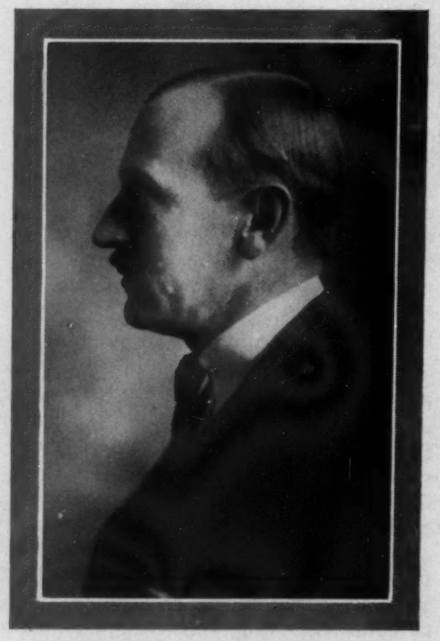
The 12 units recently added to the high pressure facilities of the Company have a combined capacity of 2,030,000 cu. ft., and were constructed at an approximate cost of $266,000. Materials for the holders were fabricated in the Los Angeles plant of the Western Pipe and Steel Company, and were shipped to the various communities and installed under the direction of the Western's engineers.

In the approximate costs given below for the erection of the several holders are included cost of foundations, piping, painting, fencing and grading of site, supervision and overhead. Cost of land is not included.

Four holders at Santa Ana, with a combined capacity of 1,000,000 cu. ft., were built for approximately $120,000; three holders in Orange, combined capacity 230,000 cu. ft., at a cost of $35,000; the two Ontario holders, of 500,000 cu. ft. combined capacity, cost $60,000; the two at Sierra Madre, with combined capacity of 200,000 cu. ft., cost $33,000; the holder at Newport Beach, with a capacity of 100,000, cost approximately $18,000.

The design of the holder now in use differs considerably from that first installed at Azusa. While the Azusa holder was built vertically, as shown in illustration No. 5, opposite, with a height of 72 feet, the present holders lie horizontally and are very inconspicuous. These horizontal cylindrical type holders have hemispherical ends and resemble small sized "blimps" in appearance. Dimensions of a typical unit, that at Newport Beach, are 20 feet diameter by 140 feet length, the net capacity being 100,000 cu. ft. The holders rest on concrete foundations, provision being made for expansion and contraction. Illustration No. 4 on the page opposite, a view of the holders at Orange, shows how inconspicuous the new type is, as contrasted with the ordinary telescopic holder. The Orange units stand only 22 feet in height and will be neatly fenced, presenting a much more sightly appearance than the usual type holder.

A. F. Bridge



M. R. Thompson

Aluminum paint is being used on all of the holders, to take advantage of the reduction in heat transference, due to the fact that sunlight is reflected from the bright surface of aluminum. This will reduce to a minimum the temperature change of gas within the holders. Six different kinds of aluminum paint are being used, to determine which is best suited for the purpose.

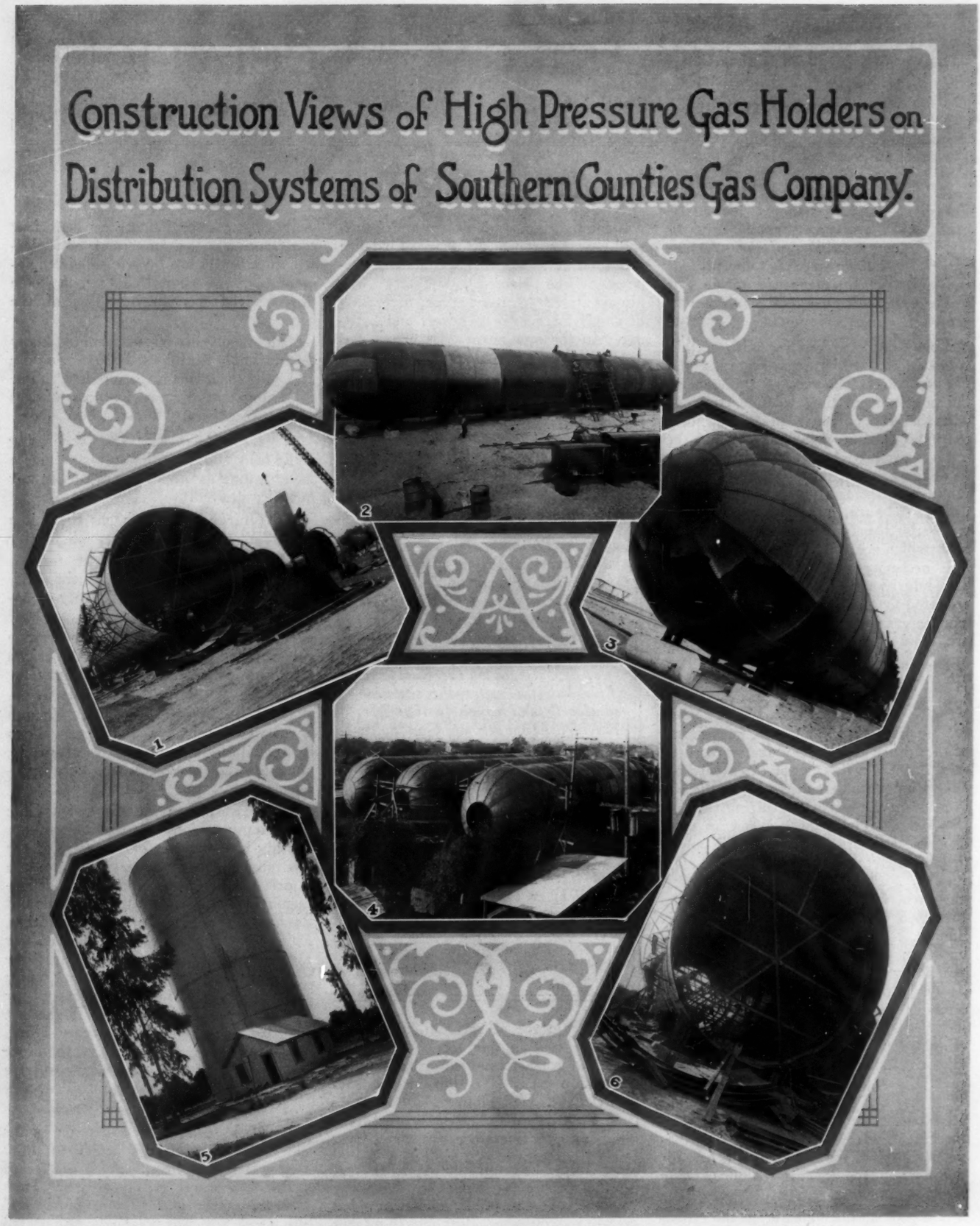
Steel plate of 7/16″ thickness was used for the cylindrical portions of the smaller holders; 21/32″ plate for the larger. The hemispherical heads for the smaller holders were 5/16″ plate; for the larger holders 13/32″ plate was used. In the construction of the 12 holders a total of 1935 tons of steel was used. To complete the 100,000 cu. ft. holders required 110 tons of steel each, while 225 tons of steel went into each of the 250,000 cu. ft. holders.

Judging from the experience in Azusa, the Company may anticipate a greatly improved service with the installation of these 12 new units. The Azusa holder has been in continuous operation since its installation in 1921, without attendance, and has given perfect service to that community. This record is especially meaningful in view of the fact that it is built at the extremity of a 35-mile transmission line. Outages had occurred frequently at Azusa before its construction, but are unknown under the high pressure system.

All of the holders erected are located at termini of the lines. Meeting the

(Continued on Page 34)

Construction Views of High Pressure Gas Holders on Distribution Systems of Southern Counties Gas Company.



1. View of the four high pressure storage tanks now under construction at Santa Ana; combined capacity, 1,000,000 cu. ft. 2. The completed 100,000 cu. ft. holder at Newport Beach. 3. View of hemispherical end of Newport holder. 4. Three high pressure storage holders approaching completion at Orange; combined capacity of 230,000cu. ft. 5. The 100,000 cu. ft. vertical high pressure holder at Azusa. Successful operation of this unit since its construction in 1921 is resulting in the application of the high pressure storage principle at other points on the Southern Counties Gas Company's lines. 6. Close-up of the largest of the four Santa Ana holders, showing detail of interior construction.

PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

Banishing *the* Spectre *of* Electrical Competition

A bulletin recently addressed to every member of the sales department of the Pacific Gas and Electric Company, including gas and electric salesmen and employees in general:

You should be familiar with certain fundamental truths regarding gas and gas appliances. In making contact with the public, from time to time, any one of us has an opportunity to clear up some misunderstanding regarding gas and the service rendered by gas appliances. In fact it is part of our service and public relations work as employees of a public utility to have our customers derive maximum benefit from the commodities with which we serve them. To do this it is necessary that we know the facts, particularly with regard to the service rendered by gas and gas appliances—that modern gas appliances, properly installed, are most desirable and contribute immeasurably to the convenience and modern features of the better homes of today.

Gas Superior as Fuel

Our president, Mr. Creed, in speaking of the future of the gas industry recently said, "gas as a fuel is not threatened by electricity, as is demonstrated by the big increase in the use of gas during the last few years. The growth is not an accident. Electricity is for light and power preeminently, but gas is superior as a fuel . . . The gas business is founded on a real economic need and will not be wiped out by any sort of competition . . . " You will be interested in knowing that this Company alone is expending nearly $7,000,000 this year on its gas properties to meet the ever increasing demands for gas service; that last year on our system nearly 30,000 cabinet type gas ranges, 13,000 instantaneous water heaters, and over 7,000 central gas heating systems were sold. Last year our total gas sales were nearly 15.3 billion cubic feet, representing an increase of 11.7% over 1923. Approximately 80% of the total gas sold was for domestic purposes, the balance being used in industry.

To gain another idea as to the economic importance of gas as a fuel, compared to electricity, the following is interesting. Our total electric sales for 1924 were approximately 1.4 billion K.W. Hrs., and of this total over 90% was for lighting, argicultural and industrial power purposes. The small balance was used as fuel and miscellaneous purposes. The electrical industry will always have to meet ever increasing demands for energy as power and lighting. In the opinion of Mr. Creed this responsibility of the electric industry will tax all of the hydro-electric development that will take place as our state grows. On the other hand, the use of gas as a fuel in our territory totalled 15.3 billion cu. ft., which on a very fair conversion basis is equivalent to 1.53 billion K.W. Hrs. of electricity, or more than the total of the electricity used for all purposes. Therefore, gas *is* and must remain, preminent as a fuel.

THE electrical sales campaign now being conducted by the Pacific Gas and Electric Company does not have as its object the displacement of gas burning appliances. To prevent any possible misconception of the purpose of the campaign and in order that both gas and electric salesmen might know the true relationship between the uses of gas and electricity, a bulletin was issued by the sales department of the Company. This bulletin states the situation so clearly and concisely that Mr. Naylor, Manager of Gas Sales, was prevailed upon to permit its publication for the inspiration of all Association members.

Knowledge, truthfulness and enthusiasm are the cardinal points of successful salesmanship. The bulletin contains the essence of all three and if seized upon and preached by all of us will effectively lay to rest the spectre of electric competition—for it is only a spectre.

CLIFFORD JOHNSTONE,
Executive Secretary.

Misconceptions of Gas

Some of the public, however, has certain misconceived ideas regarding gas, due to an unfortunate experience in some cases with obsolete equipment. Those of you who are selling electrical equipment should not capitalize upon any of these misconceived ideas in developing your sales points. There are sufficient constructive sales arguments for the electric salesmen to use favoring their equipment without capitalizing upon some misconceived gas service ideas of the prospect.

Therefore, all of us should know certain fundamental truths regarding gas and why it is the superior fuel. The following are certain features of gas which are generally known:

1. *Dependability*: Gas generating equipment and facilities to serve, give a never-failing supply of gas as fuel in any quantity desired.

2. *Quickness*: With gas there is a maximum heat instantly available at the touch of a button.

3. *Economy*: In general the flexibility of control and the efficiency of application insure economy.

(a) Gas Ranges: The average cost of preparing a meal for an American family is less than the price we pay for a package of chewing gum.

(b) Water Heaters: Enough hot water for a bath. Ten gallons can be heated on an average of about 3c, not more than the price of a daily newspaper.

(c) House Heating with Gas: Too many people think of their gas heating bill in terms of the total of the one gas bill for January, because the impression it made upon them is remembered. Of course the total gas bill does not represent the cost of heating, as a deduction should be allowed for average cooking and water heating. The net monthly cost of gas heating when figured upon this fair basis averages for the six months about one-half the net cost for the month of January alone. The cost of gas heating is therefore reasonable. It is only necessary to have good equipment properly installed.

4. *Cleanliness of Gas*:

(a) Grease deposits on walls and ceilings lead some people to think that gas is not clean. As a matter of fact there is no grease in gas. It is that the frying is done too quickly and the grease which is volatile is evaporated because of the excessive temperatures; too much heat being applied causes evaporation of the frying greases. In the modern range with the closed top feature, the distribution of the heat from

the gas burner—and the proper adjustment—minimize the likelihood of the housewife frying too quickly and evaporating the grease.

(b) The blackening of pots, pans and skillets is also thought characteristic of the gas flame. As you know, a proper blue flame is clean. It is only the yellow flame that blackens pans. This yellow flame can be easily corrected by increasing air supply adjustment. However, with the closed top model range even though the burner might get out of adjustment the flame will not come in contact with the utensils.

5. *Safety:*

(a) Some people have the idea that gas appliances are dangerous because of the likelihood of explosions. As a matter of fact explosions are very rare, considering the large number of appliances in use. Even so, the design of the newer and modern gas appliances is such that under normal operation they are considered particularly safe.

(b) Fire hazard is greatly minimized with gas appliances because of the readily controlled and evenly distributed heat. Gas eliminates the possibility of overheated flues, accumulation of soot in chimneys, sparks on the roof and other factors that are responsible for a majority of our fires. Fire prevention bureaus everywhere, as well as the National Board of Fire Underwriters, realize this fact.

6. *Healthfulness*:

(a) Homes that are heated with equipment burning gas fuel are easily warmed to the desired temperature. Healthful heating means proper heating, and the flexibility of gas insures this.

(b) Odors are *not* characteristic of the modern types of heating systems burning gas fuel. Proper installation with correct flue carries off the burned gases.

(c) The newspapers have given the erroneous impression that gas sometimes overcomes people because of the fumes. Investigation of facts shows that these cases are (1) either intentional, or (2) are the result of installing an obsolete unvented appliance that we do not recommend. When we consider our total of over 370,000 gas consumers, these accidents are very rare indeed—hardly one in 100,000. Modern gas appliances properly installed with vents and flumes have proven satisfactory and one need not worry about their healthfulness.

(d) Sweating of walls is, of course, unhealthful. However, we should know and must realize that with the modern gas appliances properly installed (that is with a vent connection to a good flue) there is no likelihood of this taking place. In the kitchen the closed top feature of the modern gas range makes this appliance fully vented. A normal amount of ventilation, which should be provided in any kitchen, will compensate for the steam given off by the boiling water. This source of moisture of course has no relation to the fuel being used, be it gas or any other fuel).

You will note from the above items listed that the positive as well as the negative features have been very frankly discussed. The use of gas as a fuel in modern gas appliances is highly satisfactory. The features of the modern appliances, such as push-button lighter, oven-temperature-controlled ranges with properly designed cast iron closed tops, instantaneous water heaters, gas heating equipment, including radiant type heaters for fireplaces, vented radiators, warm air furnaces and boilers, are all convenient and labor-saving devices. Cooking, water heating, and house heating equipment are the most important items of heating equipment. Such equipment is used several times each day, over a long period of years, and therefore deserves to be of the best type.

Modern gas appliances of quality construction, properly installed, meet the most exacting requirements in our better homes of today. That is why it is important that you and all salesmen—and our employees in general—know the truth about modern gas appliances.

Yours very truly,

F. U. NAYLOR,
Manager, Gas Sales,
Pacific Gas & Electric Company.

A NUMBER of new Association memberships have been taken out recently, including several companies and a great many individuals. The list of new members follows:

CLASS A, COMPANIES

Central Counties Gas Company, Visalia, California; Producers Gas & Fuel Company, 950 South Broadway, Los Angeles, California; Olympia Gas Company, Olympia, Washington.

CLASS C, INDIVIDUALS:

John M. Rhodes, Asst. District Manager, Coast Counties Gas & Electric Company, Pittsburg, California.

O. H. Byers, Sales Department, Pacific Gas & Electric Co., Vallejo, California; Ernest W. Kimmel, Supt. New Business Department, Pacific Gas & Electric Company, Oakland, California.

Robertson Cook, Service Engineer, Portland Gas & Coke Company, Portland, Oregon; L. C. Haffner, Industrial Engineer, Portland Gas & Coke Company, Portland, Oregon; J. D. Van Valkenburgh, Experimental Engineer, Portland Gas & Coke Company, Portland Oregon.

H E. Seagraves, Tacoma Gas & Fuel Company, Tacoma, Washington.

C. N. Boley, Vice Pres., Day & Night Water Heater Co., 509 E. 7th Street, Los Angeles, Calif.; R. B. Wheeler, District Mgr. The Tappan Stove Company, Palo Alto, California.

Los Angeles Gas & Electric Corporation employees who have recently become members of the Association are:

E. R. Adair, Chief Order Clerk; C. W. Beck, Foreman, Gas Works; Roger C. Broughton, Gas Distribution Engineer; Lyle F. Cochran, Draftsman; C. D. Cushman, Assistant Auditor; R. E. Gara, Chief Clerk to Vice President and General Manager; Chas. R. Gardiner, Collector; R. C. Gardner, Manager Alhambra District; H. W. Hemenway, Chief Clerk to Secretary; J. J. Inker, Foreman Gas Works; J. F. Klimper, Chief Clerk to Chairman Board of Directors; H. J. Knollman, Chemist; R. R. Lloyd, Paymaster; Frank Maple, Special Collector; Oral R. Marvel, Chief Clerk to Supt. Gas Mfg.; R. G. Morle, Industrial Gas Engineer; Paul A. Patchen, Asst. Constructing Engineer; Samuel Poorman, Jr., Attorney; Eugene P. Ramsay, Advertising Agent; C. J. Requa, Assistant Chief Salesman; W. R. Shettel, Constructing Engineer; H. J. Siadal, Chief Clerk to Constructing Engineer; Douglas Van Dyke, Attorney; H. C. Vander Heyden, Asst. Chief Draftsman; A. T. Vawter, Industrial Salesman; Wm. C. F. West, Statistician.

One Horse *and* One Rabbit

WE ALL know the story of the fifty-fifty rabbit stew—one horse and one rabbit. One of the reasons why gas is not more universally used for cooking and heating is that it is in many instances the rabbit in a combination gas and electric company. The reason for this is hard to understand, but it appears to lie largely in a state of mind created by the advertising power of the huge financial interests back of the electric industry and fostered by the romance connected with that subtle giant—electricity. The relative worth of the two fuels does not warrant the stress laid upon electricity and in fact the economic advantage of the community is often subverted.

We all know that with no development of the arts within our vision can electricity ever displace gas for cooking and heating. Many of us are strongly suspicious that much of the cooking and heating load of electric companies is being served at a loss, especially when the appliances are sold, on terms, at cost or less. The danger to combination companies of so many high powered "do it electrically" campaigns lies in their tendency to create dissatisfaction with perfectly good gas equipment, about which very little is said. Both Judy O'Grady and the Colonel's Lady may get the idea that, until they can get the high priced electrical equipment, they will not buy that new gas range or put in a gas furnace. The Colonel's Lady may be able to meet the bill, but Judy O'Grady is lost forever.

GAS HOLDER SITE TO BE MADE INTO PUBLIC PARK

A scenic and recreational park will surround the newest holder being constructed in Salt Lake City by the Utah Gas and Coke Company. The holder, which is under way at 2300 South Fifth East Street, is to serve as an auxiliary supply station and will be ready for operation in about two months, according to George R. Horning, general manager of the Company.

EDITORIAL

A Sign of Progress

SOME would have it that the gas industry is held fast in the grip of a chronic lethargy, and perhaps that accusation may be levelled with fairness at isolated companies here and there. But anyone who follows the trend of the industry, even casually, knows that lethargy is not a general characteristic.

The gas industry is awake to its needs and opportunities. In the realm of education this is becoming particularly apparent. There is within the industry a growing demand for educational offerings on gas, gas utility operation, gas appliances, and related subjects. This demand is a healthy indication of progress, for it is equivalent to a desire for betterment.

Gas utilities appreciate the desirability of providing for employee education. Thus a course in gas combustion was recently concluded by the Southern California Gas Company; the Los Angeles Gas and Electric Corporation had an enrollment of 587 in a course in company operation offered last summer. Other examples might be cited.

Outside of the gas utility field there are agencies as active as are the utilities in providing educational opportunities. For example, in this issue of *Western Gas* is described a course on gas appliances, to be presented under the auspices of the extension division of the University of California at the request of the Gas Appliance Association.

In October Columbia University opened a 24-lesson course by mail, in gas company operation. The state colleges of Iowa and Oklahoma both conduct short courses for gas metermen. Pennsylvania State University offers instruction in public utility economics. A series of weekly radio talks on gas and oil are being broadcast from the University of Pittsburgh's studio KDKA at the present time. Such efforts as these are made only because there is a demand for them within the gas industry, and may be regarded as tokens of the gas man's desire to improve himself in his profession.

A Window Display Department

GOOD window displays and successful retail practice go hand in hand, in gas appliance merchandising as well as in other lines of selling. Leaders in the retail field have come to charge off a set proportion of rent against window space, depending upon the displays to pull a definite volume of buyers into the store.

Recognizing the importance of the window display, and desiring to put before its readers some helpful suggestions on effective window arrangement for the sale of gas appliances, *Western Gas* is this month devoting some space to a window display department. This feature will appear regularly in our columns, each article treating a different window trim, with instructions as to its preparation. With these features will appear photographs of actual exhibits prepared especially for this purpose by an expert on gas appliance display, together with diagrams showing the position of each article.

Our readers will find it worth their while to follow this department, and to profit from some of the hints given on proper window arrangement, for the displays presented will embody the best in that line.

Better Left Unsaid

CARBON monoxide publicity, which has been reflected so decidedly in the decrease of gas appliance sales, has caused a few dealers to forsake their better judgment in preparing advertising copy. A few dealers (luckily the practice is not general) are writing copy that is calling up the spectre of "death by gas", instead of creating a demand for gas appliances. Advertising of the sort which says *"The X Y Z heater will not produce carbon monoxide", is* virtually urging the public to look elsewhere for heating equipment, for it calls back every lurid tale of asphyxiation, explosion, suicide by gas, or what-not, that has ever lodged in the mind of the reader—all bulked indiscriminately under the head "carbon monoxide," and linked with the use of gas appliances. Newspaper space does not sell for a song; it should be used to broadcast the comforts, the economy, the convenience, the dependability of gas, the ideal fuel—burned in efficient modern appliances.

The Top of the Season!

CHRISTMAS has a variety of meanings to the gas man. For one thing, Christmas Day means a peak load; another, it should mean increased sales to the gas appliance dealer who has been alive to his opportunities. To *Western Gas* this Christmas is more than an ordinary one, for it is our first. With a fresh sincerity, therefore, we publish our holiday wish to everyone in the West who labors in the cause of Gas: *"The top of the season!"*

This Absorption Plant *Was* Constructed *for a* 450 lb. Gas Pressure

Gasoline Content of Gas is Reduced to one one-hundredth of a Gallon per Thousand Cubic Feet

By GORDON M. JACKSON
Sales Manager
C. F. Braun
& Co.

Illustration No. 3. Absorption Plant of Magnolia Gas Co., at Latex, Tex., with distillation unit in foreground, showing still, reflux condensers, condensers and exchangers.

HIGH pressure absorption has been practiced to a considerable degree by several of the West Coast companies. As far as the writer has been able to determine, however, no plants have been built in California for pressures over 400 lbs. The gasoline absorption plant of the Magnolia Gas Company at Latex, Texas, was designed and built for 450 lbs. gas pressure. It is believed that a general description of the design and operation of this plant will be of interest to *Western Gas* readers, partly on account of the unusual conditions and partly because all of the heat transfer apparatus was supplied by a California manufacturer.

60,000,000 cu. ft. Daily Discharge

The location of the plant is Latex, in eastern Texas, at the compressor station of the Magnolia Gas Company. Here the compressors, driven by 10 large 975 h. p. four cycle Cooper gas engines, discharge 50 to 60 million cubic feet of gas daily through an all welded gas line which supplies fuel to the Beaumont Refinery of the Magnolia Petroleum Company. An interesting feature of the compressor house is the appearance of the engines and compressors; they are completely finished with Duco paint.

All of this gas is cooled in 10 tubular coolers, one for each compressor (Illustration No. 1). The coolers were all tested, both at the factory and after installing, to 900 lbs. per sq. in. gage. Water for the coolers as well as for the engine jackets is supplied by a large modern open louvre type atmospheric cooling tower. This tower, which is well known on the coast, was completely factory fabricated from California redwood and shipped in unit sections ready for bolting together. To insure long life the frame is bolted together with brass bolts. All tie rods and turnbuckles are of brass. Such nails as are used in fabricating deck and louvre panels are of copper.

From the coolers the gas is led to the five high pressure absorbers (Illustration No. 2). Like the coolers, these were tested to 900 lbs. In passing over the great surface in this improved static tower, the gasoline content is reduced to one one-hundredth of a gallon per thousand cubic feet. These results are obtained by using greatly improved uniform grids and by a repeated collection and redistribution of the oil as it progresses down the tower.

From the absorbers the gases pass to the line. The oil under absorber pressure passes through float controlled valves to a vent tank from which wild gases are drawn and in which the pressure on the oil is reduced to about 60 lbs. This pressure forces the saturated oil through small tubular heat exchangers of the most modern design to the steam pre-heater and thence to the still.

Changing Oil Temperature

In the exchangers the oil temperature is raised to 250° to 260° F. The hot oil coming from the still is cooled from 300° to 130° F. in the exchangers. The excellent performance of this exchanger unit is attributed to the patented orifice type turbulence plates used by the manufacturer. The oil outside of the small tubes is maintained in a highly turbulent condition by passing continually through the thin edge orifices. Exceptionally

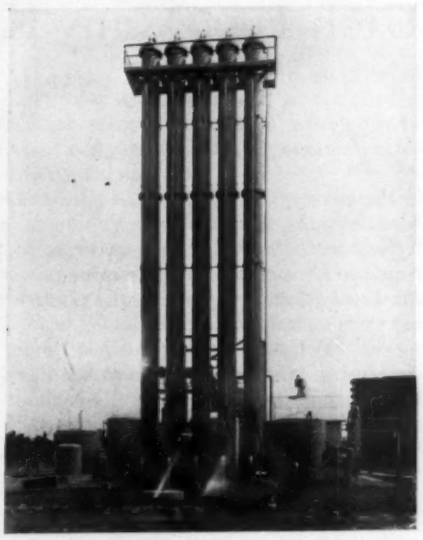


Illustration No. 2, showing absorbers built for 450 lbs. pressure.

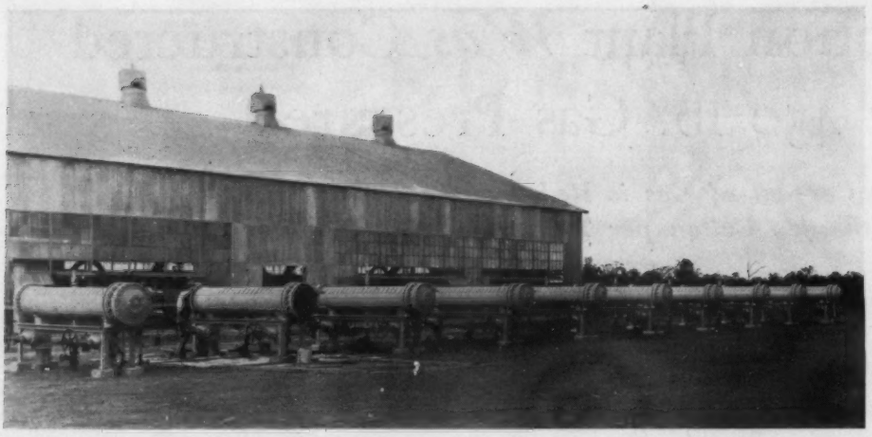


Illustration No. 1. A Battery of Gas Coolers, Under 400 lbs. Pressure

high heat transfer rates are thereby obtained with minimum friction loss. From the exchanger the oil then passes through an intercooler.

Scale trouble, which is so common on the surfaces of dephlegmators, is prevented by circulating the denuded oil for cooling the vapors. After being reduced in temperature to about 95° in the intercooler, the oil circulates through the tubes of the reflux condenser, shown in Illustration No. 3. This cooling unit controls the vapor temperature to the condensers. By means of a thermostat on the vapor outlet and a diaphragm valve on the oil line, the end point is automatically controlled with great accuracy.

For cooling the oil, tubular coolers are used similar in construction to the heat exchangers. The advantages claimed for this type of cooler are:

1. Low first cost.
2. Great length of life.
3. High salvage value.
4. Portability.
5. Interchangeability with heat exchangers, etc.
6. Low foundation costs.
7. Minimum field labor required for installation.

The condensers (also of the small tubular type) are supported between the still and rectifying column in a vertical position (Illustration 3). Cooling water for all of the oil coolers and condensers is supplied by a cooling tower identical as to construction but slightly smaller than the tower supplying the engines and gas coolers.

By means of by-pass valves on inlet and outlet of all exchangers and coolers, any one unit may be cut out for inspection or cleaning without disturbing the plant operation.

The gas coolers, cooling towers, absorbers, and distillation unit were manufactured by C. F. Braun & Co. in their factory at Alhambra, California. The engineers of this company worked out all flow diagrams, piping details, and supervised field erection.

Utah Has Many Kinds *of* Natural Gas

By J. E. BRAMWELL, *Utah Oil Refining Company*

A LETTER of November 5 addressed to WESTERN GAS *by J. E. Bramwell, who is with the exploration department of the Utah Oil Refining Company, gives some interesting facts regarding that company's activity in the development of naturad gas in the State of Utah. Several kinds of gas have been brought to light, including some gas of considerable helium content, as described in the accompanying excerpts from the letter. As yet no profitable production has been secured by the company in Utah, but efforts are being made to turn the helium producer over to the Government. Excerpts from the letter follow:*

We have completed two gas wells containing large percentages of methane and ethane. One of these wells is about fifteen miles northeast of the town of Cisco, Utah, on the Denver & Rio Grande Western Railroad between Salt Lake and Denver. The exact location is: Section 25, T. 20 S., R. 22 E., S. L. B. & M. The well encountered gas at a depth of 1960 feet in a sand which we consider the Dakota series. Soon after encountering the gas it was struck by lightning and the rig burned down. It was with considerable difficulty that the flame was extinguished. We finally succeeded in cementing off the strings of casing by pouring cement between each separate string of casing, and then by means of a gate valve, shut off the flow. The well is now in this condition. The volume is estimated at between 10 to 15 million cubic feet per 24 hours. The rock pressure is about 300 pounds per square inch.

A second well drilled by us on Section 23, T. 5 S., R. 22 E., near the town of Vernal, Utah, encountered large flow of gas similar to the Cisco gas, at a depth of 1680 feet. This gas, we think, is coming from the so-called Sundance sand below the Morrison formation. The flow was shut-off by means of a gate valve on top of a string of $5\frac{3}{16}$ inch casing. The pressure is about 520 pounds per square inch and the volume is estimated at about 20 to 25 million cubic feet per day. The well is closed in and is in good shape for production in case any market can be found for the gas.

As the district in which these wells are located is very sparsely populated, we have not found any gas people who have been interested in taking over the properties for the purpose of marketing the gas. Some carbon-black people are investigating the possibilities for the manufacture of their product, but nothing definite has been decided up to this time.

Analyses Show Helium

In another well near the town of Woodside, on the D. & R. G. W. Railroad, we developed a large flow of non-combustible gas estimated at from 25 to 30 million cubic feet per day, at a depth of a little over 3000 feet. This gas is coming from the top of the Carboniferous formation. As the analysis we made showed a large percentage of nitrogen we thought it advisable to have a test made for helium. Dr. Cady of Kansas made such an analysis for us and determined that the helium content was a little over 1%. The Bureau of Mines at Washington, D. C., also made an analysis and found that the gas was considerably richer in helium than the gas from which they have been extracting helium in Texas. The Government is now considering taking over the well and properties for the purpose of developing them for helium.

In a well drilled by us near Price, Utah, also near the D. & R. G. W. Railroad, we encountered more non-combustible gas in what we considered the top of the Carboniferous formation. An analysis of this gas showed it to be about 98% carbon dioxide. The rock pressure showed about 650 pounds per square inch and the volume was estimated at around 30 to 35 million cubic feet per day. We made a limited investigation as to the possibilities of marketing liquid carbon dioxide from this well, but found that it would cost considerable for containers in which to market the product and therefore abandoned the idea. The well was abandoned and all casing pulled.

Gas *Versus* Competing Fuels

Electricity Is Our Ultimate Competitor. Now Is the Time to Establish the Supremacy of Gas

By D. W. CHAPMAN
Assistant Manager, Industrial Gas Sales
The People's Gas, Light and Coke Company, Chicago

AT THE present time the gas industry is meeting keen competition from crude fuels and some of our industrial engineers, perturbed by this fact, are bending every effort to outdistance these competitors. Commendable and important as such efforts may be, our engineers must not let their work along these lines cause them to lose sight of the competitors of the future.

We who are employed by public utilities are engaged in a business where the ratio of investment to income is very high. This means that our business must endure for long periods in order that the huge capital investment may be justified. There is just one tenable policy for the managers of gas companies to follow, if they expect lasting success in the industrial field; that is to locate the competitor that seems most likely to prove troublesome in the future and lick him now so thoroughly that he will stay licked.

If we take the heating mediums now in use and check each in turn for the qualities previously outlined, it will be evident that there are but two in the entire list that can satisfactorily meet the exacting requirements of modern industry. (Earlier in his paper the author says of the future fuel that it must be presentable, controllable, dependable, comfortable and economical.) These two are gas and electricity.

Probably within the next few years and certainly within the next ten, the progress which is made by the engineers who are designing gas and electric furnace equipment will determine for all time which is to be supreme.

What are the gas man's chances of success? We can design furnaces that will be just as presentable and comfortable as the electric, and judging from past experiences, we shall be having a slight advantage in dependability. The subject of controllability does not present any particularly difficult problems for the gas engineer, and the high flame temperatures that are obtainable make it possible to bring gas furnaces up to the desired working temperatures in shorter time than that required for electric furnaces.

We now have checked off four of the five desirable qualities, with city gas in a favorable position, when we are struck with the irony of the situation that confronts us.

Electricity selling at one cent per kilowatt hour and city gas of 530 B. t.u. per cubic foot selling at $1.55 per thousand cubic feet furnish an exactly equivalent amount of heat per dollar expended. In our larger cities, when electric rates of one cent per kilowatt hour, and gas rates of approximately 60 cents per thousand are in effect, one dollar expended for gas will purchase over two and one half times as many heat units as a dollar expended for electricity.

Strange to say, it is this feature of economy, where gas has the greatest inherent advantage, that furnishes the most valuable point of attack for the electric man.

Because of the absence of products of combustion, and the consequent lack of flue losses, it is a relatively simple proposition to design an electric furnace of higher efficiency than a gas furnace, but fortunately there are two positive limits to this efficiency business, one fixed and the other in the hands of the gas engineers.

Assuming that the progress made in improving methods of gas manufacture keeps pace with that made in the generation of electricity, the fundamental ratio of 2½ to 1 in heating value per unit of purchase price will continue to endure. That means that an electric furnace must be 2½ times as efficient as a gas furnace in order to compete with it in the energy or fuel cost. As an electric furnace cannot be over 100% efficient (in spite of some 120% figures that I saw in a calculation recently) and as the reciprocal of 2.5 is 4/10, it is apparent that the gas man has his opponent tied to a post as soon as it is possible to produce industrial gas appliances that have a thermal efficiency in excess of 40 %.

If my deductions are correct and I believe that they are, we who are engaged in the gas business have the situation in our own hands. What should we do about it?

First: We should develop a more aggressive sales policy. We should offer to our customers only the best furnaces that are available and we should discourage any attempt on the part of the customer to reduce first cost at the sacrifice of operating efficiency by remodeling old furnaces to burn gas or purchasing equipment not properly insulated.

There should be no hesitancy in making a definite guarantee as to the performance of the equipment quoted upon, and, in many instances, a more liberal policy as regards time payments should be adopted, in order to meet on an even footing the propositions being made by our competitors.

Second: Some means must be found of combating the idea fast becoming prevalent that products are necessarily of superior quality because they have been heated electrically.

In this fast moving civilization of ours, there is a natural tendency to accept

(Continued on Page 23)

MR. CHAPMAN, in the introduction to his paper on "Gas versus Competing Fuels," given at the Atlantic City convention of the American Gas Association and published in part in this issue of Western Gas, propounds the question: "Why so many fuels in industry?" Price won't explain the situation, says the author, for in any given field are found several competing fuels in use, regardless of varying prices. Also, it is pointed out, electricity outdistanced rivals in the lighting field, although it was not the most inexpensive of lighting mediums. The answer to the query is "sheer efficiency," and just as electricity has become supreme in the lighting field, so will some one medium for heating eventually dominate in industry.

Accepting this as true, there is only one course for the gas man to pursue, and that is to seek out now the competitor that is potentially the most fearsome rival of gas, and administer to him such a beating that he will never recover from the backset. Recognizing electricity as this ultimate foe, Mr. Chapman devotes most of his paper to a treatment of the relative advantages of the two outstanding mediums of industrial heating, and makes recommendations as to the course which must be followed by industrial gas engineers and operators in securing for gas the supremacy which is its due in the industrial field.

The fuel which completely satisfies the needs of industry must meet five cardinal requirements, says Mr. Chapman. It must be presentable, controllable, dependable, comfortable and economical. Gas inherently meets each and all of these tests as can no other fuel, and industry must be brought to a full recognition of its advantages.

Important Papers Heard *at* Sectional Meeting *of* Association

By H. Elliott Taylor

PROBLEMS having to do with the trend in gas manufacture on the Pacific Coast, with much information and discussion of a speculative nature, looking forward to the time when higher prices for oil will make necessary a change in manufacturing procedure, held the attention of the Pacific Coast Gas Association in its regular meeting, November 20th in the Auditorium of the Pacific Gas and Electric Company building, San Francisco.

President F. J. Schafer was the general chairman of all the meetings, although various section chairmen took charge of the subjects to be discussed under each particular head.

In the interests of starting and concluding the meetings promptly President Schafer found it necessary to depart from the order of the original program, but all reports and papers that had been scheduled and prepared well in advance of the gathering were presented at some time during the two half-day sessions.

A paper by H. T. Terry, chief travelling auditor of the Pacific Gas and Electric Company, on the subject of "Accounting Procedure in Handling an Intensive Installment Sales Campaign," outlined at some length the methods being followed by this company in putting across its drive for the sale of electrical appliances. As most of this material was descriptive of a method of operation that is now being successfully employed, there was little discussion upon the conclusion of the paper.

High Pressure Storage

"The Economics of High Pressure Storage" was the topic of a paper presented by A. F. Bridge, executive Engineer of the Southern Counties Gas Company, Los Angeles. Mr. Bridge's company is now confronted with the problem of planning for a considerable amount of gas storage. Taking into consideration the relative merits of high pressure and low pressure distribution, and of concentrated as against distributed storage, the paper analyzed the steps, the costs and the method of deduction by which it was decided that distributed high pressure storage would be the most economical course to follow.

Frank Wills, chairman of the technical section, took charge of the discussion which followed, and the many and varied opinions and suggestions that were brought to light, indicated that the analysis as presented by Mr. Bridge was of intense interest to the other engineers who have been, or expect to be, confronted with much the same problems.

Appliance Exhibit Planned

The report of the dealers bureau, commercial section, was presented by George Finney, secretary of the Southern California Gas Appliance Association, Los Angeles, in the absence of section chairman, B. S. Pederson. The report had to do chiefly with a proposed gas appliance exhibit, to be held in the auditorium of the Ambassador Hotel, Los Angeles, in September, 1926. A more detailed report of the plan, and probably a definite recommendation by the committee will be presented in the regular quarterly meeting to be held next February. A discussion of the project which followed its presentation showed a concensus of opinion in favor of holding an exhibit provided it is conducted so that real good may be derived from it through its propaganda effect on the public, and on architects, builders, and dealers in particular. A committee of three appointed by the board of directors of the Association will work with the gas companies, manufacturers and distributors of gas appliances so that the matter may be fully investigated prior to the February meeting.

This discussion concluded the schedule of the morning meeting, and accordingly the chairman called for an adjournment until two P. M.

E. L. Hall was the first to take the stand in the session after lunch, reading his paper "An Economic Study of Gas Manufacture." As general superintendent of the Portland Gas and Coke Company, Mr. Hall, with his associates, has been making some exhaustive studies of the future manufacturing problems that will confront the gas industry when and if the supply of oil is seriously diminished. The discussion evoked by the reading of Mr. Hall's paper was very extensive, bringing up criticism of his deductions on one hand, and just as stout a corroboration of the facts as he presented them, on the other.

Address on Personnel Work

An address by E. G. McCann, manager of personnel for the Pacific Gas and Electric Company, was the second feature of the afternoon session. "Recruiting for a Company 12,000 Strong" was the subject. The speaker pointed out the importance that public utilities are attaching to the way personnel work is handled, realizing as they do that industrial relations and public relations are in many instances one and the same thing. While most of the discussion centered around the mechanical procedure that is used in actually hiring or at least interviewing applicants, the speaker also touched briefly on uniform methods of handling employees in all departments, promotion operations and other topics of a like nature.

The last paper of the day "Gas Fired Equipment in Large Buildings" by Harry L. Warren, sales manager, Southern California Gas Company, was read by F. U. Naylor, manager of gas sales, Pacific Gas and Electric Company. The paper contained among other valuable, and instructive features, a number of excellent sales arguments that the gas man has at his service when he is advocating a gas installation in preference to either coal or oil. An analysis of costs of heating several large buildings in Los Angeles was offered, and the necessity for burning gas in boilers designed to be gas fired was also pointed out. This point was brought home by a striking example of two buildings in Los Angeles. In one, gas is burned in a boiler designed for gas, in the other in a converted coal fired boiler. In the latter building, the one having a boiler plant made to burn coal, but equipped with gas burners, 58.1% more fuel per unit of connected load is required than in the boilers designed for and burning gas. In conclusion the laudable sentiment is voiced, "We can heat the Pacific Coast more cheaply and conveniently with gas fuel than any other fuel, if we insist upon the installation of appliances designed to burn gas."

Informal Banquet Enjoyed

The regular banquet was held in the evening, and an attendance of close to one hundred and fifty was recorded by Secretary Johnstone. The banquet was informal in nature, and a splendid entertainment, especially appropriate to those in the gas business, was received with marked approval. Brief talks were made by the section chairmen as they were called forth by toastmaster F. J. Schafer.

As is the custom, the day before the general meeting was devoted to committee meetings. Every section of the Association held a meeting on Thursday. As a result of the decision of the board of directors, the Model Ordinance will be held over for final action until the next meeting of the Association. The Home Service Manual, however, will be set up in print immediately, and the first drafts distributed at an early date.

The next meeting of the Pacific Coast Gas Association will be held in San Diego in February, the exact date to be announced later. The Northwest is also scheduled to have one of the next sessions, and there is also a possibility of a special meeting being held in Arizona.

Inaugurating *a* School *for the* Appliance Man

(Continued from Page 12)

is arranging to offer four prizes based on the highest grades received. The holder of the highest individual grade will be awarded $50, the second highest $25, third prize will be $15 and fourth $10.

Through the enrollment of salesmen of Los Angeles wholesale houses, many of whom will be represented in the course, the broadcasting of the messages on better merchandising should be assured throughout Southern California, and this result is anticipated by those in charge. Mr. Finney, secretary of the Association, speaking of the possibilities that the course holds for raising gas appliance merchandising standards, says: "If the series of lectures results in building up a general demand for higher grade appliances it will have filled a public need; and, incidentally, it will have been a boon to the appliance trade of this section. Increasing the sales price of appliances sold in Southern California by one-tenth of one per cent will be worth $20,000 to our local industry, for there are approximately $20,000,000 worth of gas appliances sold in this territory every year."

Everyone in the western gas industry will follow with interest the progress of this educational enterprise, with every wish for its successful conduct. *Western Gas* will have more to present to its readers as the course take form.

CONCISE DATA ON HEAT TRANSFER EQUIPMENT

A quick-reference folder on heat transfer equipment has recently been published by The Griscom-Russell Company, 90 West Street, New York.

This folder briefly descries condensers, heat exchangers, gas and water coolers, evaporators, oil heaters, separators and regulating devices particularly adapted to oil refinery service and includes references to bulletins in which these units are more fully discussed. Copies may be obtained by writing directly to the manufacturers.

Gas *Versus* Competing Fuels

(Continued from Page 21)

anything new as being superior to the old. Electric heating, being comparatively new, has a romantic appeal and powerful interests are at work, drumming into the mind of the public that electric heating and superior quality are synonymous.

I would suggest in this connection, that a series of tests be conducted by unbiased observers in our universities or by the staffs of commercial laboratories to demonstrate that materials heat treated with gas are at least equal in quality to those treated electrically. Basic proof of this kind is absolutely essential to offset the campaign that is being waged against industrial gas.

Third: Something must be done immediately to get some form of research bureau and some large manufacturing organizations comparable to those gigantic corporations existing in the electric business to focus their attention and concentrate their efforts on the problem of developing and marketing better industrial gas equipment.

In order to show what can be accomplished by a little effort in this direction, I wish to relate briefly a story of a recent experience that we had in Chicago.

An electric manufacturer succeeded in getting an electric heat treatment furnace installed in the plant of one of our largest industrial customers. This furnace and auxiliary eqnipment, which cost in the neighborhood of $1500, was operated for a short length of time and the results obtained were compared with those experienced in working with the existing gas equipment in their heat treating department. Obviously, such a comparison could not be anything but favorable to electricity.

We went to see the management of the firm with this question: If we install in your plant a modern gas furnace costing exactly the same amount or less than the electric, and if that furnace will accomplish everything that the electric furnace does, will you purchase the furnace? The answer was yes.

No such furnace was available from the standard line of any furnace manufacturer in the country, and it was necessary therefore, for us to specify our requirements and spend approximately $3,000 for two furnaces, in order to stem the tide. A gas furnace exactly similar in size to the electric was installed and the results obtained there were favorable to gas. Nevertheless, there was room for improvement so we had a second furnace built embodying certain changes that were thought desirable from our experience with the first. This second furnace has been purchased by our customer and the figures in the following table will clearly show you why.

In a few words, in this case the gas furnace turns out just as fine a quality of work as the electric, maintains automatically just as close a range of temperature, and has considerably greater output at a lower price per unit of production.

What has been accomplished here can be repeated in the great majority of cases, but intelligent, concentrated effort is required.

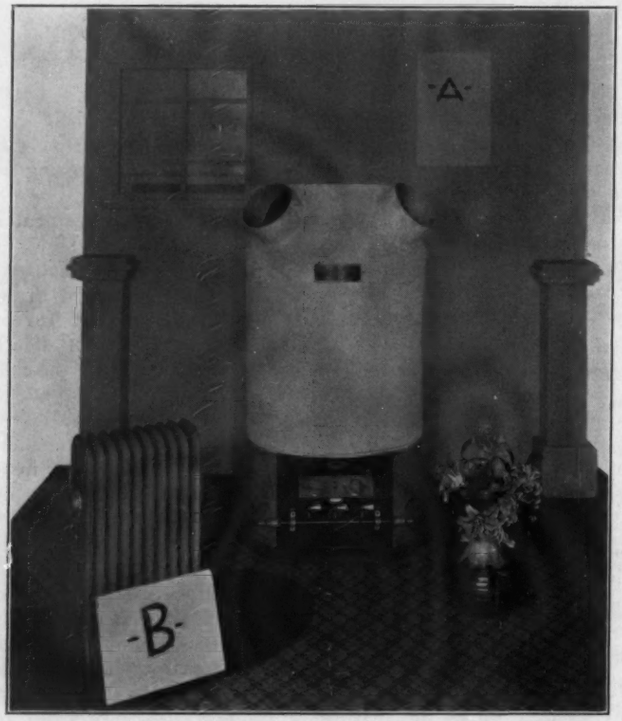
Test Data	*Electric Furnace*	*First Gas Furnace*	*Second Gas Furnace*
Duration of test (hrs)	8.585	8.75	9.5
Furnace Temp. at start	1140°	800°	1000°
Time to bring 1600° (hrs)	1.5	1.75	1.5
Consumption to bring to 1600°	30 K.W.	740 cf.	534.6 cf.
Time operated at 1600° (hrs)	7.085	7	8.5
Consumption during operating period	120 K.W.	2220 cf.	2777.87 cf.
Total fuel consumed	150 K.W.	2960 cf.	3342.47 cf.
Total number of charges	17	21	32
Total number of pieces	2890	3570	7200
Total weight (pounds)	433.5	535.5	1080
Av. consumption per piece	.053 K.W.	.83 cf.	.464 cf.
Av. consumption per charge	8.83 K.W.	141 cf.	104.45 cf.
Av. consumption per pound	.346 K.W.	5.53 cf.	3.09 cf.

55,000 GALLONS DAILY PRODUCTION FOR CALIF. GASOLINE CORP.

Total daily production for the California Gasoline Corporation's absorption plants has risen to 55,000 gallons, according to the Corporation. New compressor equipment, consisting of four 165 Clark compressors, was installed in Plant No. 1, as well as an 80 h. p. Clark in the stabilizer apparatus. Concrete foundations for Plant No. 6, in the west end of the Signal Hill fields, will be poured early in December, and the plant is expected to be operative within 60 days or sooner.

SPIRAL-GUIDE GAS HOLDER AT VICTORIA

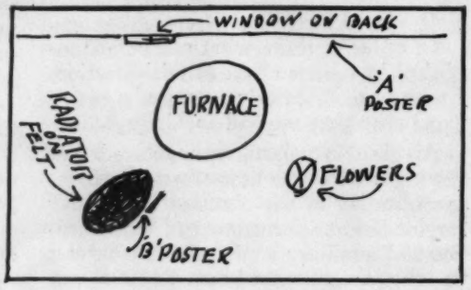
The Victoria Gas Company, Victoria, B. C., has completed a 500,000 cu. ft. capacity spiral-guide gas holder, dimensions being 120 feet in diameter by 90 feet in height.



WITH this issue WESTERN GAS institutes a window display department which will appear regularly each month.

A variety of gas appliances will be featured in the displays, including ranges, space-heaters, radiators, water heaters, etc. The furnace display shown opposite is particularly timely and is a result-getter.

A Gas Furnace Display



A WINDOW in which a gas furnace holds the center of attention is shown in the illustration above. The diagram accompanying the photograph makes clear the details of arrangement. Directions for reproducing the display follow:

For background use two pieces of wail board. (Beaver board, Upson, or Cornell.) Two four-foot widths will give a background eight feet wide, and the height will be that of the window ceiling. The background may be painted with Kalsomine, Alabastine, or any cold water tint in pale green, blue, or tan.

On the upper left hand corner, 12 inches from the top and six inches from the left side, cut a hole 24″ x 24″ for a window. Nail 1″ x 1″ finished lumber strips on the back of the opening facing the inside of the store, in position as shown in picture. Next make frame of the 1″ x 1″ strips, 24″ x 24″, and nail this frame on the side of the opening facing the sidewalk. Nail two pieces of finished lumber (1″ x 2″) 28″ long, to the top and under the frame which is now nailed around the opening.

For flooring of the exhibit use the natural flooring of the store window, or a rug. Place two posts, as in the picture, flat against the background at each end. The posts are made with two pieces of 1″ x 6″, each four feet long, and four pieces of 1″ x 3″, four feet long. Nail two pieces of the 1″ x 3″ to each piece of 1″ x 6″, forming the front of the posts. The back is left open. Use strips of moulding to form the cap. For top and base use strips of 1″ x 6″ cut to fit. Paint the posts in a sand shade, using any cold water tint.

Place the furnace in the center of the display. The flowers, set to the right and front of the furnace, will relieve the somewhat bare and severe appearance of the latter.

Place a radiator or space heater to the left and front of the furnace, on a piece of black felt cut to allow for a wide margin. Place posters "A" and "B," to carry sales messages, as shown.

The window trim described above is attractive in appearance, and at the same time is highly practical from the standpoint of cost and simplicity of preparation. The cost to reproduce this display is estimated roughly at $5.00.

WESTERN GAS will appreciate receiving photographs of any window reproductions of the above display which are used by our readers.

GAS SERVICE PLANNED FOR IMPERIAL VALLEY

The Inland Empire Gas Company has applied to the Railroad Commission for a certificate to operate a public utility gas system in the cities of El Centro, Imperial, Brawley, Heber and Calexico and adjacent territory in Imperial County, Calif., and also for authority to issue and sell $52,175 of common capital stock, and $4,000 of common stock and to use the proceeds from the sale thereof to finance construction and acquisition of property and rights of way.

H. W. Burkhart, formerly chief engineer and superintendent of construction for the gas department, City of Long Beach, is actively interested in the establishing of gas service in Imperial Valley, having charge of construction of the plants and installation of lines.

SAMUEL KAHN LEAVES WESTERN STATES G. AND E. CO.

Samuel Kahn, who has for the past 12 years been vice-president and general manager of the Western States Gas and Electric Company at Stockton, Calif., was made vice-president and general manager of the Market Street Railway Company, when that San Francisco utility was acquired during November by H. M. Byllesby and Company of Chicago. The Stockton company is also a Byllesby property. Mr. Kahn, while resigning from managership of the Western States Gas and Electric Company at Stockton, retains the vice-presidency and a place on the directorate.

JANUARY MEETING FOR A. P. I. IN LOS ANGELES

January 19, 20, and 21 are the dates set for the sixth annual meeting of the American Petroleum Institute, to be held this year in Los Angeles. Headquarters and sessions of the convention will be at the Biltmore Hotel. Some of the sessions of the A. P. I. meeting will be devoted to natural gasoline, and a program designed to cover important phases of that industry will be presented. Many members of the Natural Gasoline Manufacturers' Association plan to attend.

RATE HEARINGS LAID OVER UNTIL DECEMBER 8

During the three days beginning December 23 rate hearings were held by the Railroad Commission of California on the applications of the Los Angeles Gas and Electric Company, the Southern California Gas Company, the Southern Counties Gas Company for increases in rate. The Commission has laid the hearings over until December 8.

CRIBBAGE HONORS RETURN TO WEST

In the September issue of *Western Gas* was published an account of the inter-coastal cribbage match played at the last P. C. G. A. convention, at which "Big Bill" Hutchinson engineered a victory for the East against "Big Hearted" Harry Bostwick, who represented the West by virtue of his victories at El Monte two years ago.

Now *Western Gas* has the pleasure of announcing that the West has back her own. Carrying his honors to the A. G. A. convention at Atlantic City "Big Hutch" made the stratigical error of accepting a challenge from a woman, none other than Mrs. William Baurhyte of Los Angeles. To quote Cliff Johnstone, who reported the fray to *Western Gas*, "Mrs. William Baurhyte defeated "Big Bill" Hutchinson most decisively in a series of games and can now be proclaimed the cribbage champion of the gas industry."

C. L. DICKINSON RETURNS FROM KANSAS CITY, MO.

C. L. Dickinson, Pacific Coast Manager for the Chapman Valve & Mfg. Company of Indian Orchard, Mass., has just returned from a business trip over his western territory, making the trip back to the Coast via Kansas City, Mo.

GEORGE D. ROPER DIES AT AGE OF 70

George D. Roper, head of the Roper Corporation, and widely known throughout the gas industry, died at Rockford, Ill., on November 17 at the age of 70. Mr. Roper had an extensive acquaintance in the West, being a charter member of the Pacific Coast Gas Association.

WESTERN BUILDING PERMIT VALUATIONS ON INCREASE

Building permits for the month of October, 1925, compared with those of October, 1924, for the western states, as reported by the F. W. Dodge Corporation, show increases as follows: Arizona, $165,036; California, $1,540,416; Idaho, $224,020; Texas, $4,779,160; Utah, $422,251; Washington, $452,532; Wyoming, $14,745.

HAMMEL FOLDER ANNOUNCES NEW L. A. SCHOOL CONTRACT

The Hammel Radiator Corporation, Los Angeles, manufacturers of gas steam radiators, have published a new folder descriptive of their line and its manufacture. The folder announces a recent contract secured from the Los Angeles Board of Education to supply the "Hammel" for all school buildings requiring the unit type of gas steam radiators, during the school year which closes June 30, 1926.

HUGHES TOOL COMPANY TO MAKE HIGH PRESSURE VALVES

The Hughes Tool Company of Houston, Texas, has just completed a $350,000 addition to its plant, adding equipment to manufacture high pressure and high temperature valves for the natural gas and gasoline industries. A. A. MacDonald, 2445 Enterprise St., Los Angeles, is their California manager.

NEW COMPRESSION EQUIPMENT FOR L. A. GAS AND ELECTRIC

At the Ducommon Street gas plant of the Los Angeles Gas and Electric Corporation a new 1,000,000 cu. ft. per hour capacity gas compressor has been placed in service. The new equipment is of horizontal, high pressure, double-acting type, compressing up to 60 pounds pressure and having a 3,000 rated horse power.

LOMITA GASOLINE INCREASING GATHERING CAPACITY

Gathering capacity of field lines in the northwest section of the Signal Hill fields for the Lomita Gasoline Company's absorption plant is being increased by the installation of a 165 h. p. Clark compressor.

BOOKLET ON EVAPORATOR PLANTS READY FOR DISTRIBUTION

The Griscom-Russell Company, 90 West St., New York, has issued a late booklet on distillation as a means of producing pure boiler feed make-up water, presenting diagrams of approved layouts and outlining conditions under which evaporators can be used advantaegously. Copies may be had on application to the company.

GAS APPLIANCE SOCIETY

A Department Conducted by F. U. Naylor, Secretary

A LETTER received recently from Louis J. Breuner, president of the Gas Alliance Society, gives a very clear expression of Mr. Breuner's views on gas company competition with retailers in the sale of gas appliances. Following is a quotation from the letter:

"A striking example of what co-operation between the gas companies and the dealers has accomplished is demonstrated right here around San Francisco Bay. Several years back the gas company was in the retail business, and was persuaded to retire from the field and let strictly retail dealers handle the sale of appliances, with the result that this particular territory is outstanding in the splendid volume of appliances sold for home use, and the large percentage of increase of gas consumption through the use of these appliances.

"Healthy competition creates more business. Unhealthy competition retards business and makes advancement slow. The natural avenue of distribution is through many retail stores, each dealer in the field to make a success of his own business and to sell as many appliances as possible.

"It is true that there are incompetent dealers in all lines of business. It is also true that there are dealers who are satisfied to sit back and wait for business to come into their establishment, and right here is where the gas company can do its greatest good for itself; that is to stay out of the retail business and to establish in its promotion department a means of educating the dealers as to the proper methods of conducting their business, and to stimulate them to get after the business.

"As stated above, this plan has been highly successful around the San Francisco Bay District, and the gas company and the dealers are in a very friendly and co-operative frame of mind."

Notes from San Francisco Unit

Max Brown of Charles Brown & Sons has a cook who won one of the prizes in the $1500.00 Cake Baking Contest, recently held by the Society. Naturally, she used one of Mr. Brown's ranges.

Sterling Furniture Company, Charles Brown & Sons, Gough Furniture Company, and Richmond Furniture Company all staged big cooking schools during November. Mrs. D. R. Withers, the Home Economist for the Society, was in charge.

The bureaus of the local unit have finished making their recommendations to the Pacific Coast Gas Association, relative to the model ordinance. The local unit took full advantage of the opportunity to co-operate with the Association and tried to give as much constructive criticism as possible.

The members of the heating bureau are co-operating to make better warm air furnace installations. The following firms did considerable co-operative advertising in San Francisco and are now making all their bids and installations according to the Code of the Society: Atlas Heat & Ventilating Co., Montague Range & Furnace Co., Pacific Gas Heating Co., Rund Heater Company, Wm. P. Goss, C. B. Babcock Company and Potter Radiator Corporation.

Fresno Unit

A meeting of the Gas Appliance Society's Sales School was held at the Pacific Gas and Electric Company's office Friday evening, November 13th. E. C. Cooley and H. E. Eckenroth, of the Potter Radiator Corporation's San Francisco office, gave a demonstration of how to sell "hot air." Judging from the amount of it dispensed at the meeting, Fresno's warm air furnace sales are due to take a big jump.

Membership Plaques

The brass membership plaques are being distributed to members of the Society this month. They are very attractive articles and the members are all proud to display them.

East Bay Unit

Sam W. Terry is reported as being busily engaged in filling out his allotment of Gas Appliance Society Proposal blanks for warm air furnaces. It is reported, on good authority, that he ran out of blanks the other day and attempted to submit a bid to a prospective purchaser of a Hall Gas Furnace on the reverse side of his business card. The customer skeptically looked over the card and passed it back remarking that he would consider no bid except one submitted on Gas Appliance Society specification sheets—rather a hard blow on Sam, who has long sponsored the proposed blank idea. It is said that the

(Continued on Page 28)

Applying Double Wrapping of Pipe Covering to 10-Inch Pipe in the Field

Preventing Soil Corrosion *of* Underground Piping

By DOZIER FINLEY
Director of Technical Research, The Paraffine Companies, Inc.

CONSERVATION of iron is probably fully as important today as is conservation of forest products. The most easily worked iron deposits, like the most accessible forests, are being rapidly used up. Yet iron probably plays the greater role in industry, for even in a lifetime iron has almost exclusively replaced wood in ship and bridge building and in the framework of the larger buildings—to say nothing of minor uses.

Excess Metal Used

Steel ships, iron fencing, metal covered buildings and underground piping generally fail because of corrosion—usually long before the desired life of the structure has been lived. The clumsy expedient is adopted of using an excess of metal so corrosion will have further to go to render the structure valueless. We may see pipe carrying fluids and gases at as low as thirty pounds pressure, while the walls are sufficiently thick to withstand a pressure of 1,000 pounds. That this great excess of metal is not needed to withstand mechanical stresses is proved by the fact that despite the excess of metal the pipe seldom fails save through corrosion.

From the point of view of conservation in our own community this problem looms large when it is considered that several large corporations on the Pacific Coast own underground piping systems which individually will measure in excess of 75,000 tons of steel, and in nearly every case the amount is growing at a rate far beyond the rate of increase of population.

The protection of underground pipe has passed through many phases.

The problem is complicated because no one can yet say definitely exactly what causes corrosion and the examination of corroded metal leads to apparently contradictory conclusions. After years of service a length of pipe may be unaffected except at a single small area, yet chemical analysis fails to show differences of soil or metal at the area of attack. Again a pipe may be corroded badly throughout except beneath shop numbers painted on it with red lead. Yet a line of pipe painted with red lead might, and in some instances has been found to, undergo rapid and destructive corrosion!

Conflicting Theories

Much has been done in an experimental way to give support to various theories of corrosion. Probably the electrolytic theory has found most support; it centers around the consideration that there is a tendency for iron itself to pass into solution, as it were, when brought into contact with water solutions or various salts, alkalies and acids. In fact the iron under these conditions is deemed to behave exactly as the elements of an ordinary "dry" battery, with the formation of both positive and negative poles on the surface of the same piece of metal. Other theories tend more toward the direct chemical attack of the corrosive agent on the iron; some even go so far as to advance evidence that earth acids, derived from both living and dead organic materials in the soil, produce corrosion of underground iron by direct attack.

Since corrosion was first observed, the main effort at prevention has been to interpose an insulation between the metal and the corrosive agent—a plan which has much to commend it, no matter which of the theories of corrosion may be correct. In the earlier days this scheme of treatment seldom went beyond coating with paint. But paint coats invariably are porous in varying degree and, where soil is particularly favorable to corrosion, are not effective in protecting pipe. Asphalt and tar dips afford thicker coats with fewer pores, but are easily chipped or abraded, particularly in handling and installing underground pipe.

In more recent years much has been done in the way of producing corrosion proof "steels"—of which stainless steel knife blades are but one example—but the application of metal alloys of this character apparently cannot be economically carried out so far as underground pipe is concerned. Making the surface of the iron immune to corrosive agents can be accomplished to a limited degree but, like painting, fails to be dependable on a large scale below ground. Application of metal coatings by a spray method has been tried, but also, it would seem, without accomplishing the desired result.

Bituminized Preparation

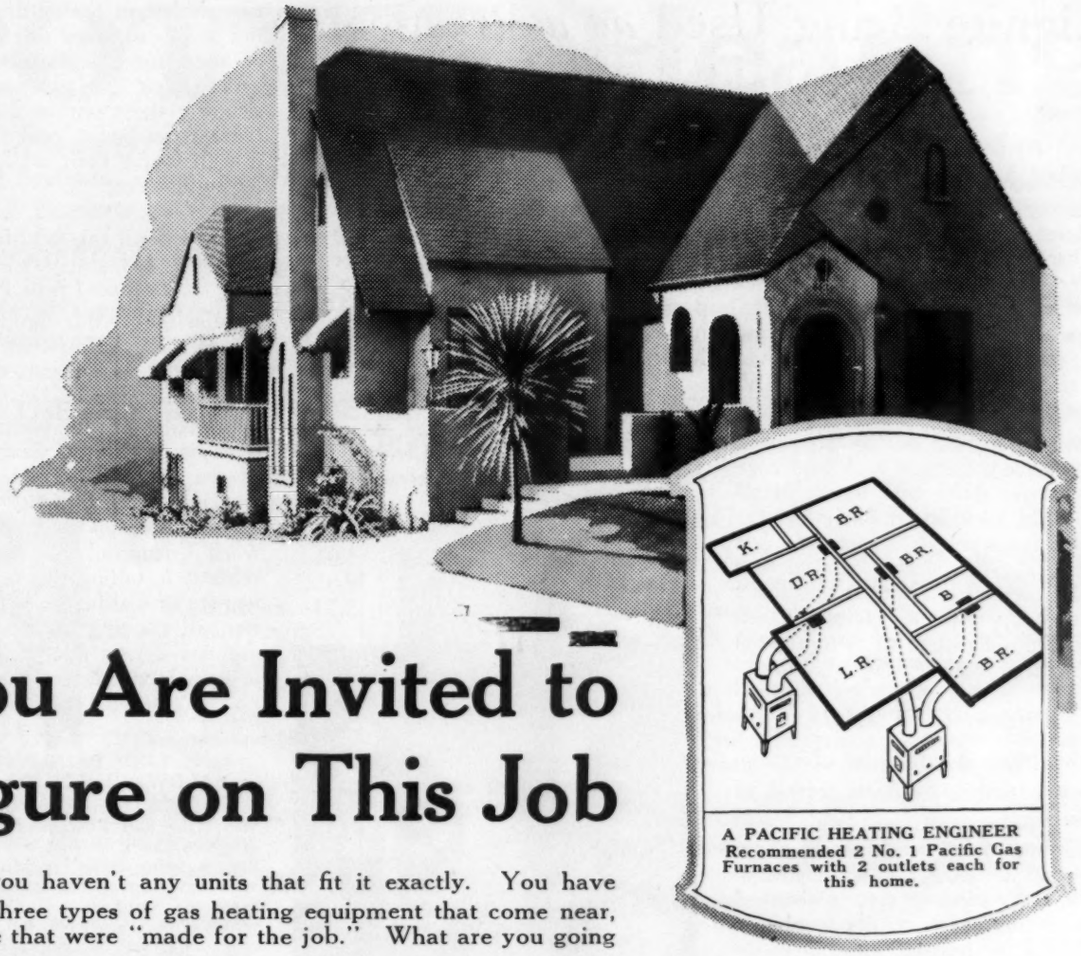
Mechanical application of bituminized felted fabrics wrapped spirally around pipe has been a development of the present decade. These coverings are cemented to the pipe by a hot bituminous compound; in some instances this bituminous cement is also applied outside of the wrapped covering. The tension under which the covering is applied precludes the presence of loose pockets between pipe and covering, as frequently occurred when coverings were applied by the methods used in earlier attempts to solve this problem. The character and thickness of the covering, its toughness and high resistance to water and water solutions of earth alkalies, make it an insulation of an order far beyond the paint of other days and any of the dipped coatings.

It is evident that the waterproofness of such a covering makes it impossible for a "battery," such as we have above described. to be formed — for positive and negative poles would not be formed, and iron would not "pass into solution" if solutions of the soil elements could not reach the metal of the pipe because of the waterproof covering. But if, on the other hand, we choose to disregard the more finely worked out electrolytic theory of corrosion, and say that iron pipe in contact with certain soils "just rusts," we come to the same conclusion as to the efficacy of this method—for the covering effectively bars contact between pipe and soil, or pipe and soil moisture.

Starting practically with the 250 miles of the Terra Bella and Lindsay-Strathmore Irrigation Districts in 1916 and 1917, the system of application by machine of a spiral wrapping of special bituminized felt base covering has steadily progressed in nine years, until thousands of miles of pipe on the Pacific Coast, ranging from ¾ inch to 44 inches, are now so covered. Some

(Continued on Page 37)

Riveted Steel Water Main (44-Inch) with Mechanically Applied Covering, Spring Valley Water Company, Near Niles, California.



A PACIFIC HEATING ENGINEER
Recommended 2 No. 1 Pacific Gas Furnaces with 2 outlets each for this home.

You Are Invited to Figure on This Job

—and you haven't any units that fit it exactly. You have two or three types of gas heating equipment that come near, but none that were "made for the job." What are you going to do?

Concentrate on Pacific Equipment!

With Pacific's complete line of gas heating appliances, you are never confronted by this problem. A unit from Pacific's line fits every possible demand for homes, schools, churches, stores, theatres, apartment houses and office buildings. You can serve customers better and make more money for yourself.

Pacific Heating Engineers Help You!

The Pacific Gas Radiator Co. maintains a staff of Heating Engineers to help dealers make bids and specifications. This service is absolutely FREE to Pacific dealers.

Write for Agency Proposition

The Pacific Complete Line

Pacific Pressed Metal Radiators
Pacific Cast Iron Radiators
Pacific Gas Steam Radiators
Pacific Basement Furnaces
Pacific Floor Furnaces
Radiant Recess Heaters

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

General Offices: 1740 W. Washington St., Phone BEacon 2190.
Downtown Display: 616 W. 8th St. Factory: 7541 Roseberry St., Los Angeles.
Representatives throughout the West.

Lignite Being Used *as a* Practical Gas-Making Fuel

(Continued from Page 13)

both bottoms and one middle retort. The quality of the gas was lowered by this increase, and for some time we varied back and forth until the difficulty was overcome. Later both middles and bottoms were carbonizing lignite, and our top retorts furnished the coke for bench fuel. For over a year we made gas in this manner, averaging about 65 per cent lignite coal.

From time to time during this period we would fire a furnace with cold coke and try single shifts with lignite in all retorts. On several occasions we were successful for a few days at a time, but only after a great number of trials did we find a method of doing it constantly day after day without having to fall back on the old system of charging top retorts with regular coal.

Different Coals Tried

At this point in our series of experiments, we tried coals from several of the different mines in the Sheridan coal field, finding only two that gave approximately the same results. Continuing this, we compared results obtained from screenings with results from nut, pea, egg and lump coal. The conclusion was that clean nut or pea grades were best when the demand necessitated charges running from 450 to 650 pounds per retort per eight hours. Screenings gave best results when used in charges of less than 450 pounds each. Several times we have carbonized as high as 11,700 pounds of lignite coal in one bench in 24 hours, the carbonization period being eight hours.

Now we had arrived at the real problem, that of converting our furnace to the use of lignite for bench fuel. We concentrated on this problem during the months of June and July, 1924, and mastered the difficulty on one of our old benches. Before warming up a new bench, we made the necessary changes in furnace construction which we thought would bring the desired results. One thing to be overcome was that of preventing the draft from by-passing the fire. Naturally a coal fire in our furnace could not be fired as heavily as a coke fire. When we started a slow fire in our new bench and began to bring up the heat with lignite coal, you can well imagine our anxiety. If our theories did not work out as we had planned, the result would be that we would have to go back to our old system and continue to use 35 per cent of our retort coal at a price of $6.15 per ton more than our own Sheridan coal. At the end of the twelfth day, I was convinced that we would be successful. Later on, when the bench finally came to the proper heat, it was put into service and has never had even a forkful of coke to help the heats.

Lignite Coal Analysis

Since September 1, 1924, we have made coal gas in our plant from lignite coal exclusively. The analysis of this coal is follows:

Moisture	22.25
Volatile matter	35.01
Fixed Carbon	39.01
Ash	3.73

Lignite Gives a Residual Resembling Inch and a Half Screenings, the Yield being 800 Pounds per Ton of Coal Carbonized

Sulphur	.37
Determined B. t. u.	9617

The gas supplied to the city of Sheridan from this coal will average 535 B. t. u. per cubic foot. Our equipment consists of four standard one-half depth benches of sixes, and the changes which we have made in order to utilize our local coal have cost only a moderate sum of money.

Both the Sheridan-Wyoming Coal Company, and the Hotchkiss Coal Company who own and operate a number of mines in this vicinity, have shown a fine spirit of co-operation. We have found that coal from the Monarch mine owned by the former, and the Hotchkiss mine owned by the latter are equally satisfactory when used for retort coal.

Lignite a Coming Fuel

In conclusion, let me state that, after conducting experiments with lignite coal for three years, I am thoroughly convinced that in the future large quantities of this so-called low grade fuel will be used for gas making purposes. I believe that gas plant operators, particularly those within a reasonable distance from lignite coal fields, will find it well worth their while to investigate its possibilities.

Gas Appliance Society

(Continued from Page 25)

popularity of this proposal form has caused a number of coal furnace dealers to adopt it as a means of getting their appliance over.

Speaking of gas warm air furnaces, it seems that "Shy" Seagraves, manager of the Frank L. Pollard Company, is working a crew nightly in order that he may catch up on his orders for Gleewood Furnaces. He proudly boasts of recently installing two units for the University of California to be placed in the football training quarters. When they are not drying out their football suits it is understood that they are warming up the "Den for the Golden Bear."

GAS LINE BEING BUILT FROM BALDWIN HILLS TO ROSECRANS

A 15-mile, 10-inch gas line between Baldwin Hills and Rosecrans fields, in the Los Angeles basin, to cost approximately $150,000, is being built for Murphy and Dillon, who have contracted to handle the dry gas from the Standard Oil Company's gasoline plant at the Inglewood field.

The gas will be delivered to the Murphy and Dillon line under high pressure and will be carried to the pipe-line system of the Industrial Fuel Supply Company, connection being made at Rosecrans, being distributed from there to consumers in Long Beach, Los Angeles and at other points. Completion of the line will be made in time for the winter peak of fuel gas consumption, which is expected around the first of the year.

BIG GAS PRODUCTION CURRENT AT VENTURA

Gas production estimated at approximately 110,000,000 cu. ft. daily is reported for the Ventura fields, of which about 45,000,000 cu. ft. is flowing from the Lloyd No. 15 well. Gas from this latter well is all being treated for gasoline extraction. Local opinion in the Ventura fields has it that the peak of production in the field will be reached within the next two or three months.

MIDWAY GAS LINE IS NOW UNDER TEST

The 13-inch high pressure gas line of the Midway Gas Company, extending for 52 miles from the Ventura fields to Midway's lines at Castaic, is now being tested and will be in operation soon, bringing gas to Los Angeles and vicinity. To force gas through this line a 12-unit compressor plant has been erected in Ventura with a total of over nineteen hundred horsepower, Cooper direct-driven, two-stage compressors of 160 h. p. being used. The line will have an ultimate capacity of twenty million cubic feet of gas a day and will bring gas from the Shell and General Petroleum leases near Ventura.

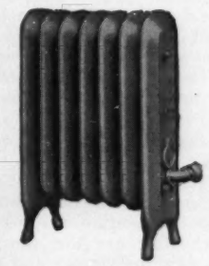
POTTER Heating

For many years POTTER Engineers have pioneered the way in the advancement of modern Gas Heating Systems. They have developed Gas Heating to such a degree of perfection that today, POTTER Products have become a standard of comparison wherever dependable, safe, economical and healthful gas heating is discussed.

OUR BEST ASSET

The tens of thousands of satisfied customers that our Organization has made through POTTER Gas Heating installations, is a JUST tribute to a satisfactory product—a gratification to conscientious effort.

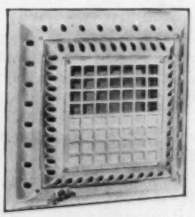
THERE ARE MANY REASONS WHY IT IS BETTER TO INSTALL POTTER SYSTEMS



POTTER Vented Radiators

Only POTTER has these 7 POTTER Features (Cast Iron and Steel-Made)

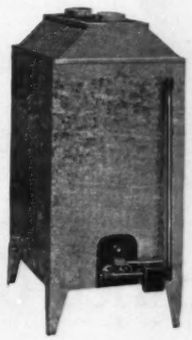
1. Condensation abolished. This does away with corrosion. Many years are added to the life of the Radiator.
2. Triple Circulation. The heat goes into the room, not up the flue.
3. Uniform warmth distribution. The air is never "cooked."
4. Quick heat. No other radiator heats so quickly as the light, efficient POTTER Steel-Made.
5. Aristocratic appearance. The POTTER Cast Iron Radiator is selected for the finest and largest homes.
6. Totally odorless always.
7. Not expensive.



COLE Floor and Wall Heaters

Made in heavy solid cast aluminum.

COLE is the only furnace manufactured that can be installed on either the first or second floor.



"MAGIC WAY" FURNACES

"MAGIC WAY" was the first, and has always been considered the leading Unit System of heating.

The principle of Unit Heating of modern buildings, brought to its present state of refinement through the study and efforts of this Organization, is based on the principle of an individual furnace or heater for each room or group of rooms to be heated.

This type of installation allows accurate temperature control in each room, regardless of the demand in other sections of the home.

POTTER quantity production now makes "MAGIC WAY" with electric controls, available to anyone who desires a gas furnace system.

The same features that make these well known POTTER-made appliances favorites with home builders and home owners, make them popular with churches, schools, theatres, auditoriums and factories.

The low cost of adequate heating by means of "MAGIC WAY" Vented Furnaces of either the Unit or Central Plant type, will be a revelation.

"MAGIC WAY" VALVES

By merely pressing a button, the temperature of any room may be regulated. This valve not only turns the heat on but it regulates the heat to suit your exact wants.

The HALL Floor Furnace

When the furnace type of heat is desired at low cost or when a basement is not available, use HALL Vented Floor Furnaces.

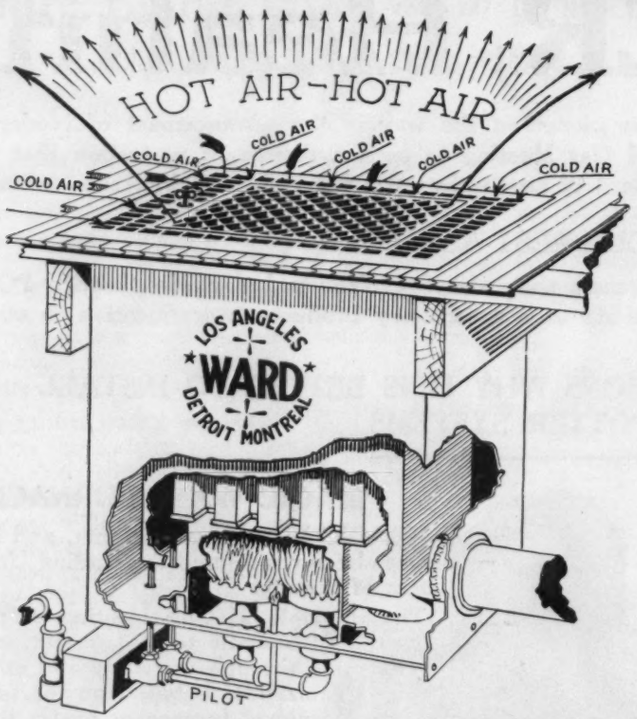
Potter Heating Includes:

"MAGIC WAY" UNIT FURNACES
"POTTER" GAS RADIATORS
"RA DO" GAS RADIATORS
"HALL" GAS FURNACES
"STEEL-MADE" GAS RADIATORS
"COLE" FLOOR AND WALL FURNACES

There Is a **POTTER System** for Every Need

POTTER RADIATOR CORPORATION

San Francisco—Oakland—Los Angeles—San Diego



More than 200,000 Satisfied Users Will Help You Sell This Furnace

Homes, churches, offices, schools, hospitals and public buildings —more than 200,000 of them—have adopted this simple, sensible, saving way of heating.

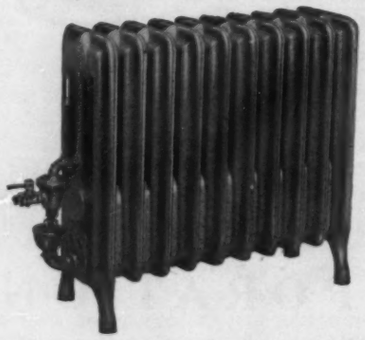
Healthful heat, ample heat—heat that circulates and chases the chill out of cold corners—is the heat your customers want.

Thousands of dealers are finding it profitable to supply this demand for Ward Furnaces. Perhaps your territory is open. Why not write today for details.

WARD HEATER COMPANY

General Sales Offices: **1243 SOUTH HOPE STREET, LOS ANGELES**

THE LATEST



Hammel

Gas Steam Radiators

Unit System of Heating — Steam Heat in Ten Minutes

WE ARE now able to offer some very profitable territory to dealers who can qualify. The *Hammel* line offers a very liberal profit and its repeat orders will build a substantial business for you.

Good Territory for Live Dealers
Write for Literature

Hammel Radiator Corporation

715 So. Figueroa St. Los Angeles

Company Cooking School Wins Dealer Good Will

THE cooking school and advertisers' exposition recently held at Santa Monica, California, gave the Southern Counties Gas Company an opportunity to win the good will of the local merchants by offering them the services of the director of their home service department. The plan devised was to put on a morning demonstration, using the gas ranges displayed by local dealers.

Miss Allobach, who heads that department of the Southern Counties Gas Company at Santa Monica, demonstrated the value of the oven control, irrespective of the make of range, cooking and serving a plate luncheon to eighty-five people. It was a demonstration of the whole meal cooked by oven control, and it also was a personal achievement in that she put over the demonstration without the support of a trained group of helpers.

While the meal was cooking she lectured on the different dishes she would serve, giving directions for their preparation, and explaining the food and nutritive values of each. She also made biscuits and had them ready to serve with the meal.

The second day's demonstration was devoted to breads. Here again the merchants saw their own ranges in use. The Southern Counties Gas Company did not exhibit, nor did Miss Allobach mention the particular range for which they are the agents. As on the previous day, the recipes and a scientific talk on yeast and flour and breads were given to wives and mothers of Santa Monica who crowded the hall.

Christmas festivities being but six weeks away, Miss Allobach demonstrated a fruit cake. The materials were prepared before the audience, and while the oven control was keeping the temperature at the desired figure, the lecture was given.

Bonus *for* Ward Employees

SUBSTANTIAL Christmas presents in the form of bonuses ranging from 10 to 20 per cent of their annual salaries are to be distributed next month to employees of the Ward Heater Company, 1243 South Hope street, Los Angeles, according to an announcement just made by Samuel Sproat, president of the organization.

This distribution, which will run into many thousands of dollars, follows the company's decision to boost production schedules in its Los Angeles plants to $1,500,000 for the ensuing year, preparatory to concentrating all of its manufacturing activities in California. Two local factories and three assembly units will handle the bulk of the work formerly performed in the firm's Detroit and Kansas City, Mo., establishments.

Employees who have been in the service of the Ward Company a year will receive bonuses of 20 per cent of their annual compensation, Mr. Sproat declared.

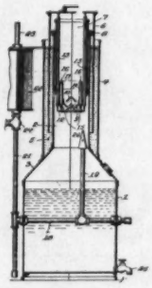
Most of this money, the president stated, will be invested in California homes by his employes, 96 per cent of whom are married. Of the total number, 83 now either own their homes, or are buying them on the installment plan, a recent survey showed.

LABORATORY QUARTERS FOR PACIFIC GASOLINE CO.

Laboratory quarters have been rented in Vernon for the joint use of the Pacific Gasoline Company's research department and the Goodwin Chemical Company.

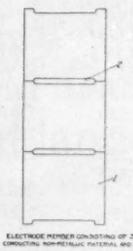
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,544,445. GAS GENERATOR. WILLIAM C. GILMORE, Waco, Tex. Filed Nov. 7, 1924. Serial No. 748,460. 2 Claims. (Cl. 48—53.1.)



1. A gas generator of the class described comprising a casing having a water chamber in its lower part, a hopper in its upper part, a water chamber surrounding the said upper part, a bell in said chamber, a valve controlling the outlet of the hopper, a U-shaped rod carrying the valve, the limbs of the U extending above the top of the hopper and adapted to be engaged by the bell, a pair of springs, one on each side of the valve and connected with the bight of the U for holding the valve upon its seat and an outlet pipe connected with the casing for leading the gas from the casing.

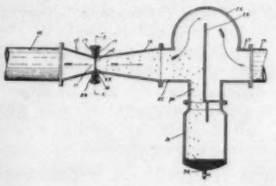
1,541,678. COLLECTING ELECTRODE FOR ELECTRICAL GAS-CLEANING APPARATUS. WILHELM JOHANNES LORENZ BAUER, Frankfort-on-the-Main, Germany, assignor to International Precipitation Company Los Angeles, Calif., a Corporation of California. Filed Jan. 8, 1924 Serial No 685,065 6 Claims. (Cl. 183—7.)



1. A collecting electrode for an electrical gas cleaning apparatus comprising an electrode member consisting throughout of a mixture of semi-conducting non-metallic material and carbon.

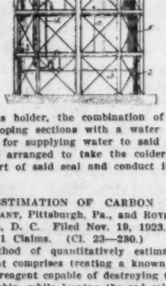
1,544,950. GAS PURIFICATION. HARRY F. SMITH, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio, a Corporation of Ohio. Filed July 5, 1921. Serial No. 482,486. 3 Claims. (Cl. 183—43.)

1. In apparatus for purifying gases, a Venturi tube, through which the gas to be purified is passed, a pervious diaphragm within said tube, within which diaphragm the impurities carried by the gas are caused to agglomerate into particles of substantial size; and



means associated with the outlet end of the Venturi tube for removing such agglomerated particles from the gas.

1,545,084. GAS HOLDER. GEORGE EDWIN CROSBY, Boston, Mass. Filed Jan. 9, 1924 Serial No. 685,270. 3 Claims. (Cl. 48—177.)

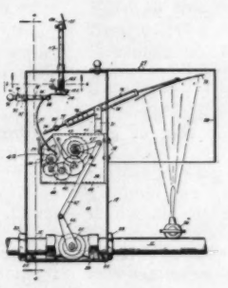


1. In a gas holder, the combination of a bell comprising telescoping sections with a water seal between them, means for supplying water to said seal, and an overflow pipe arranged to take the colder water from the lower part of said seal and conduct it away from the seal.

1,542,979. ESTIMATION OF CARBON MONOXIDE. WILLIAM YANT, Pittsburgh, Pa., and ROYD R. SAYERS, Washington, D. C. Filed Nov. 19, 1923. Serial No. 675,771. 11 Claims. (Cl. 23—230.)

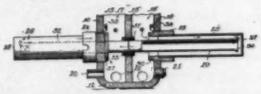
1. The method of quantitatively estimating carbon monoxide, that comprises treating a known quantity of blood with a reagent capable of destroying the red color of oxyhemoglobin, while leaving the red color of carbon monoxide-hemoglobin, and comparing the resulting color with a standard colorimetric scale prepared in colors corresponding to definite quantities of carbon monoxide-hemoglobin in the said quantity of blood.

1,543,057. AUTOMATIC THERMOSTATIC GAS CUT-OFF. FRANK COLONNA, Brooklyn, N. Y. Filed Dec. 5, 1923. Serial No. 678,564. 13 Claims. (Cl. 67—114.)



1. An automatic fuel cut-off comprising a fluid pressure actuated means, adjustable means on said fluid pressure actuated means for adjusting the latter for operation at a predetermined fluid pressure, fuel cut-offs means associated with said fluid pressure actuated means for closing the supply of said fuel when the fluid pressure has dropped to or below said predetermined fluid pressure and a chamber associated with the automatic fuel cut-off through which said moving fluid is made to move in a vertical column out to the atmosphere and in which said fluid pressure actuated means is arranged.

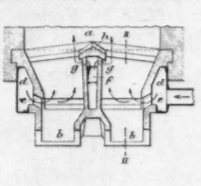
1,540,208. HEAT-EXCHANGE UNIT. JOHN EDWARD ECCLESBACK, Chicago, Ill., assignor of one-third to George F. Paul and one-third to Ralph N. Hartwick, both of Chicago, Ill. Filed Aug. 4, 1923. Serial No. 655,664. 8 Claims. (Cl. 257—254.)



3. A heat exchange unit comprising a hollow casing, a central partition dividing the interior thereof into side-by-side headers, said partition and the adjacent opposite walls of said casing provided with aligning apertures, a plurality of tubes mounted in the apertures of said partition and carried thereby and extending from opposite sides of said partition through the respective apertures in said casing, and a plurality of cylinders having open ends secured to the respective apertures and surrounding said tubes upon the exterior of said casing whereby fluid from one header is conveyed to the other header through the partition by the medium of said tubes in conjunction with said cylinders.

1,645,060. CONTAINER FOR THE DRY COOLING OF COKE. ARNOLD MORETTELI, Oberwinthur, Switzerland, assignor to the Firm of Gebrüder Sulzer, Aktiengesellschaft, Winterthur, Switzerland. Filed May 4, 1923. Serial No. 636,540. 1 Claim. (Cl. 202—11.)

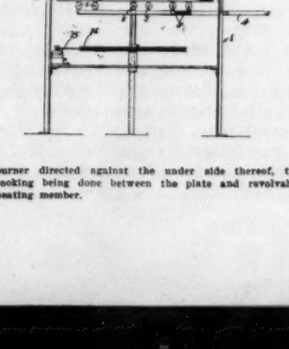
In a container for dry cooling of incandescent coke by means of gas forced through the charge of coke as it passes through the container, the combination of a bottom part consisting of a hopper provided with a discharging device and with openings therethrough adapted for conducting cooling gas into the outer portions of the space therein, a checking member in said container adapted to prevent the central portion of a body of coke therein from dropping faster than the remaining part, said checking member being provided with channels and openings for injecting gas into the



central portion of the hopper, and means for connecting the channels in the checking member with a source of gas.

1,543,212. COOKING STOVE. THEODORE KUBRELL, HEINRICH SCHNEIDER, and JOHN U. FISCHER, San Francisco, Calif. Filed Apr. 12, 1924 Serial No. 706,077 10 Claims. (Cl. 126—34.)

1. A cooking stove comprising a stand, a stationary cooking plate supported by the stand, a burner beneath the cooking plate, said plate having an opening therein, a burner beneath said opening arranged to direct flames above the plate and a revolvable heating member mounted above and in upwardly spaced relation to said plate in position to have the flames from the second named



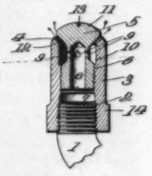
burner directed against the under side thereof, the cooking being done between the plate and revolvable heating member.

1,544,977. CONVERTIBLE BURNER. CHARLES E. GREGORY, Chicago, Ill., assignor to Automatic Gas Oil Burner Co., Chicago, Ill., a Corporation of Illinois. Filed June 5, 1924. Serial No. 717,980. 10 Claims. (Cl. 158—11.)

5. A convertible gas and oil burner comprising a truncated cone, the top of said cone being cup-shaped, means to supply oil to said cup-shaped top, the surface of said cone being corrugated, gas tips arranged on said surface to direct gas into said corrugations, and

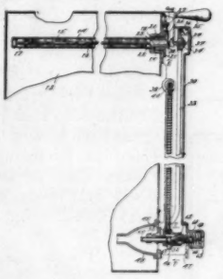
a gas chamber within said cone and communicating with said tips.

1,543,507. GAS BURNER. CHARLES MUNNERS, Chicago, Ill., assignor to American Stove Company, St. Louis, Mo., a Corporation of New Jersey. Filed Aug. 2, 1923. Serial No. 655,229. 1 Claim. (Cl. 67—87.)



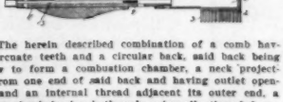
A gas burner comprising a housing having an intermediate internal screw-threaded portion, its upper end beveled outwardly, an interior member having its lower end made hollow and provided with an intermediate reduced portion, its upper solid end flared outwardly to correspond with the bevel of the outer extremity of the housing, laterally extending openings formed through the intermediate reduced portion and the enlarged lower end screw-threaded to fit the intermediate screw-threads of the housing, whereby a chamber is formed between the said intermediate reduced portion and the housing, and the enlarged head is adjustable, for the purpose described.

1,543,744. THERMOSTATIC REGULATOR FOR OVENS. HUBERT A. BARSCHOW, Laporte, Ind., assignor to Rudolph Hoffman, Cleveland, Ohio. Filed Aug. 22, 1922. Serial No. 583,662. 17 Claims. (Cl. 236—15.)



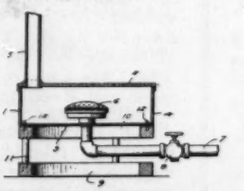
1. An automatic fuel cutoff including a fuel control means normally spring closed, a lever engaging said fuel control means, a fulcrum upon which said lever moves, thermostatic means for controlling the lever, and a flexible fuel supply means mounted in conjunction with said lever and adapted to be moved thereby.

1,545,157. GAS-HEATED HAIRDRESSING COMB. JAMES E. MIDDLETON, Philadelphia, Pa. Filed Apr. 17, 1922. Serial No 554,063. 3 Claims. (Cl. 34—26.)



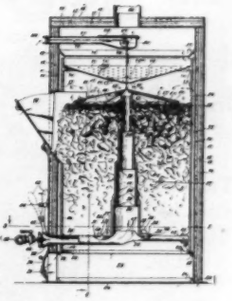
2. The herein described combination of a comb having arcuate teeth and a circular back, said back being hollow to form a combustion chamber, a neck projecting from one end of said back and having outlet openings and an internal thread adjacent its outer end, a tubular shank having both ends externally threaded one of which is screwed into the neck with the extreme inner end projecting beyond the outlet openings, said shank having air inlet openings adjacent the inner threaded end, a terminal having threaded connection with the outer end of the shank, a burner tube carried by said terminal and projecting into the shank with its inner end terminating short of the air inlet openings, and a handle on said shank

1,541,685. GAS STOVE. HORACE M. CAWOOD, Los Angeles, Calif. Filed Nov. 22, 1924. Serial No 751,582. 1 Claim. (Cl. 126—40.)



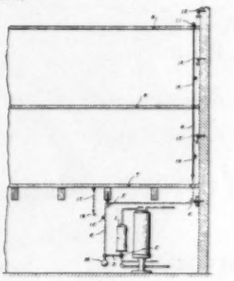
A gas stove comprising a stand, a shallow hollow body mounted upon the stand and having an inlet air opening in its front and a vent pipe connected with the rear portion of its top, and a burner disposed within the body, the stand comprising similar upper and lower frames and connecting posts, and said stand having dowels or pins projecting from its top to enter openings in the bottom of the stove body to hold the parts when properly assembled.

1,544,323. INCINERATOR. EDWARD KENER, Jr., Buffalo, N. Y. Filed Aug. 27, 1921. Serial No. 496,043. 31 Claims. (Cl. 110—18.)



1. An incinerator comprising an incinerating chamber adapted to receive refuse, a vertically movable burner plate arranged in said chamber and adapted to rest upon the upper surface of said refuse, and means for providing a flow of gas to the underside of said burner plate.

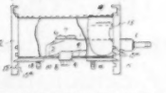
1,544,945. UNIVERSAL GAS-WATER-HEATER CONTROL. ELIAS VICTOR SEIXAS, Philadelphia, Pa. Filed Aug. 15, 1924. Serial No. 732,330. 3 Claims. (Cl. 137—139.)



1 The combination with the control valve of the burner of a gas water heater, of a control rod, flexible means connecting said control rod to said valve, eyelets on said rod and swingably supported hooks for engagement in said eyelets

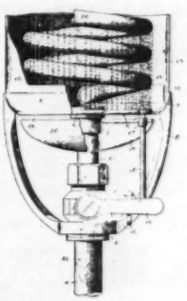
1,542,212. GAS BURNER AND HEATING APPLIANCE. JOHN WAINWRIGHT BOWERBANK, Kidderminster, England. Filed Apr. 5, 1924. Serial No. 704,537. 1 Claim (Cl. 126—40.)

A gas heating appliance comprising a burner of the kind described secured centrally upon a bottom plate having an air inlet aperture centrally beneath said burner and an upstanding rim surrounding said burner, means for adjusting the burner valve from above the bottom plate and also from below said plate, radial arms on said



plate, means for radially adjusting said arms, and means on said arms inter-engaging with the legs of a stand associated with the vessel to be heated to secure said appliance at different positions in said stand, substantially as described.

1,542,241. GAS BURNER. CARL HARTMANN, San Francisco, Calif. Filed July 15, 1924. Serial No. 726,137. 7 Claims. (Cl. 126—350.)



1 A gas burner comprising a plurality of arms each having a plurality of restricted apertures; a ring mounted around the burner arms and adapted to receive an element to be heated; a reflector mounted below the arms and ring and having its upper edge in slightly spaced relation to the lower edge of the ring to form an annular air passage around the burner arms; and a valve controlling the passage of gas to the burner arms whereby gas from a source of supply may be caused to issue from the restricted apertures in the arms without prior admixture with air for burning below and around the element to be heated, the combustion of said gas being supported by air admitted around the burner arms only through the passage between the reflector and the ring.

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Natural Gas Gasoline Operations

ONE HUNDRED FORTY-SIX natural-gas gasoline plants, with a daily indicated capacity of 1,024,600 thousand cubic feet, of a total of 149 plants operating in California in October report a recovery of 28,065,256 gallons of natural-gas gasoline from 21,644,903 thousand cubic feet of gas treated.

Utilization of natural-gas gasoline amounted to 713,496 barrels, an increase over September of 49,441 barrels, of which 89,584 barrels were unaccounted for in the reports received by the Bureau of Mines. This quantity of natural-gas gasoline was presumably disposed of to blenders and refiners not reporting to the Bureau of Mines at present.

Stocks of natural-gas gasoline at the end of October amounted to 74,849 barrel, of which 25,407 barrels were reported by natural-gas gasoline plant operators and 49,442 barrels by refinery operators. This is a decrease of 45,276 barrels under September stocks.

The production of gasoline during the month of October amounted to 159,481,499 gallons, a daily average of 5,144,564 gallons. This is an increase of 21,345,201 gallons, or 15.45 per cent over September output. Of this production 324,528 gallons were reported as finished gasoline produced by natural-gas gasoline plant operators. Compared to the production in October, 1924, an increase of 61,436,046 gallons, or 62.66 per cent is noted. Of the gasoline produced, 348,677 gallons were from using either a cracking or synthetic process and 159,132,822 gallons from other processes.

Stocks of gasoline show an increase of 14,196,514 gallons during October and at the end of the month amounted to 395,541,484 gallons. This stock figure includes 24,588 gallons of finished gasoline reported by natural-gas gasoline plant operators.

Natural-gas gasoline blended at California refineries during October amounted to 380,465 barrels. The September total was 353,488 barrels.

NATURAL-GAS GASOLINE PRODUCTION AND DISTRIBUTION FOR CALIFORNIA

October, 1925

Type of Plant	*Gas Treated Thousand Cu. Ft.*	*Gallons Natural Gas Gasoline Produced*	*Gasoline Recovery MCF Gas Treated*
Oil Absorption	10,073,718	11,659,328	1.157 Gal.
Compressor	353,925	509,338	1.439 Gal.
Combination Compressor and Oil Absorption	8,842,256	12,315,693	1.393 Gal.
Combination Oil and Charcoal Absorption	2,375,004	3,562,532	1.5 Gal.
Drip		18,365	
Totals	21,644,903	28,065,256	1.297 Gal.
Natural-Gas Gasoline Distribution			
Stocks First of Month			120,125 Bbl.
Production During Month			668,220 Bbl.
Quantity Mixed with Crude or Unfinished Oils		229,083 Bbl.	
Used in Blending at Refineries		380,465 Bbl.	
Stocks End of Month		74,849 Bbl.	
Used at Plants, Shortage and Evaporation Losses		14,364 Bbl.	
BALANCE*		89,584 Bbl.	
Totals		788,345 Bbl.	788,345 Bbl.
Finished Gasoline Produced at Plants		324,528 Gal.	
Stocks at End of Month Held by Natural Gas Gasoline Plant Operators			
Stocks Natural-Gas Gasoline Held by Natural Gas Gasoline Plant Operators		1,067,075 Gal.	25,407 Bbl.
Stocks Natural-Gas Gasoline Held by Refineries		2,076,564 Gal.	49,442 Bbl.
Total Stocks Natural-Gas Gasoline		3,143,639 Gal.	74,849 Bbl.
Stocks Finished Gasoline (Motor Fuel) Held by Natural-Gas Gasoline Operators		24,588 Gal.	

*Disposition of this balance was not accounted for in the reports received. It is presumed to have been disposed of to Blenders and Refiners who are not at present reporting to the Bureau of Mines.

Betterments Due *in* Hemet Utility

A RECEIVER'S sale of the Southwestern Gas Company, serving Hemet and San Jacinto, Calif., held early in November, resulted in the acquisition of the company by the Twin Cities Gas Company of which Joseph M. Berkley is president. The Twin Cities Gas Company serves Beaumont and Banning.

Mr. Berkley announces that plans are formed to rebuild the gas plant at Hemet and to construct a pipe line across the mountains between Banning and Beaumont, dismantling the plant at Beaumont and serving Banning and Beaumont from Hemet. This action is dictated by the lesser freight rate on oil available at Hemet, according to Mr. Berkley.

Improvements considerably in advance of present needs are to be made in the system, two holders of 50,000 cu. ft. capacity each being planned, one for Banning and one to be located at Hemet. An attempt will be made to increase the load, which is entirely domestic, by putting in a heating rate as soon as possible.

Possession of the property will be had by the Twin Cities Gas Company by December 15. Mr. Berkley states that a program covering the expenditure of $30,000 in new money for improvements will begin at that time.

An office in Hemet was to be opened December 1 by the company, Los Angeles headquarters being maintained at 411 Hollingsworth Building.

Research Council *in* Annual Meeting

THE annual meeting of the California Gas Research Council was held in San Francisco at the offices of the Railroad Commission on November 19. The report of the Executive Engineer, Walter M. Berry, summarizing the work of the Council during the past year, showed that material progress had been made on the principal research projects covering refractories, soil corrosion and pipe protection, interior corrosion of mains, reforming of natural gas, oil sprays for gas generators, and investigation of western coals for gas making. Further work on many of these projects will be continued during the coming year, and one or two additional lines of investigation will be undertaken.

Technical Work Progressing

The status of the technical work of the California companies is showing steady progress. This has been due largely to the liberal expenditures being made by the companies for research, and the securing of several additional men of technical training for the research problems.

The following extract from the Executive Engineer's report is particularly pertinent in view of the doubts often expressed regarding the value of research to a public utility organization:

"Research and investigation are the life blood of almost any industry that we may want to consider, but the value of research to a public utility is not so apparent in that the business is not faced by the same hazards of competition, and on the other hand it does not share in the rewards resulting from lessening of costs. There are other factors that should be regarded, however, by a utility when considering the value of research, and I have thought of discussing these some time at greater length. These factors are, in brief:

What Research Does

"1. Research produces facts. Facts are worth time and money and make decisions easier.

"2. The improvement in the technical side of our business makes the business more attractive to the better trained men and thus makes the work of the executive easier.

"3. Improvement in our own knowledge and its consequent effect in greater accuracy of methods and procedure throughout our whole business will create confidence and respect of the public and will solve much of our difference regarding rates, service, etc.

"4. The financial and operating structures of our companies will be spared the sudden shocks resulting from development of new processes and use of new materials if the companies retain the leadership in knowledge pertaining to their industry."

Oakland Cooking School Aims *to* Serve

THERE have been many types of cooking schools in recent years, the vast majority of which are considered entirely satisfactory from the view point of the promoters. The prime motive of such schools has largely been to sell the idea of using an appliance or the fuel with which the appliance is operated.

In the Housewives' Cooking School, now being held in Oakland, Calif., under the auspices of the Range Bureau of the East Bay Unit, Gas Appliance Society, an entirely new idea has been worked out—that of giving an up to date course of domestic cooking with no thought of selling either fuel or that particular range used for the demonstration.

The classes are being held in the auditorium of the Oakland office of the Pacific Gas and Electric Company and the instruction is given by Mrs. Belle De Graf, who needs no introduction to western women as an authority on household economy.

Different Types Used

It has been the plan of those promoting this enterprise to use at each class a different type of gas equipment and to give those women attending a visible demonstration of the many advantages to be obtained in having such an appliance in the home.

Questions as to range operation are gladly answered in a half hour just prior to the lesson and an attempt is made to clearly explain the general features of the particular model being used before the start of the lesson.

The different dealers interested in this project have taken turns in furnishing a demonstrating model, and the work of cleaning the appliance, delivering and connecting has been part of their expense. They have also gone a step further and given general publicity to the effort through their advertising and personal contacts with the buying public.

Publicity for School

At the opening of the school some three hundred invitations were mailed to a select list of East Bay housewives, explaining the nature of the course and inviting them to register, citing the educational value in attending such a school and stating that there would be no fee attached. Posters and newspaper stories were used to create interest. Also a direct mail plan of advertising was entered into.

The results in attendance have been more than gratifying; at present approximately 150 women are enrolled and expressions of appreciation and interest are heard on every hand.

Mrs. Belle De Graf has endeavored to carry the lessons a step further than the mere preparation and cooking of food and has shown many short cuts in household economy. The proper setting of the table for social functions and how to buy meat and vegetables with an eye to economy have been explained to the women.

A decided interest in the modern gas range has been manifest in more than one instance and it is the universal opinion of range dealers that a stimulus to the sale of better gas equipment will result from this enterprise.

It is hoped for the future to build the classes up to a still greater attendance and to go into the problems of home management and home equipment still more extensively.

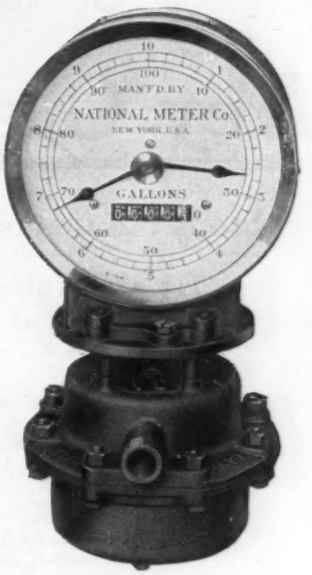
BELT-SLACKER DESCRIBED BY LOS ANGELES MANUFACTURER

Harry M. Perry, 702 North Main St., Los Angeles, Calif., manufacturer of a ball bearing belt-slacker and slack belt idler, has recently issued a reference sheet describing his product.

VICE-PRESIDENT OF WALWORTH CO. IN CALIFORNIA

W. P. F. Ayer, vice-president of the Walworth Company of Boston, Mass., manufacturers of pipe fittings and valves, has just completed a month's stay in California, returning east November 24. Mr. Ayer's trip was a combination of business and pleasure, and included visits in San Francisco and Los Angeles, and a motor trip to San Diego.

OIL METERS



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The Use *of* High Pressure Storage *on a* Large Scale

(Continued from Page 14)

winter peak will be an easier task in 1925-26 than previously, with the new tanks automatically discharging into the distribution mains whenever the pressure drops below five pounds. Maximum pressure in the Santa Ana and Ontario holders is 50 pounds, while in the Newport, Sierra Madre and Orange holders it is 40 pounds. The tanks fill at off-peak periods, and function automatically at all times, all manual attendance and compression machinery being dispensed with. These factors weighed heavily in the decision of the Company to adopt high pressure generally throughout its systems. It is also pointed out that first construction costs are considerably less for high pressure holders of 1,000,000 cu. ft. capacity and smaller, than for other types. Since the new holders have no moving parts they will require practically no repair, save for painting and upkeep of site. In the case of the Azusa holder its erection enabled the Company to indefinitely postpone the laying of larger transmission lines, which would have cost several times the amount of the holder.

Why High Pressure Storage Was Adopted

Some of the considerations which prompted the adoption of high pressure storage on the Southern Counties lines will perhaps have interest for the gas man in other sections of the West. At the 29th annual convention of the Pacific Coast Gas Association held at Santa Barbara in September, 1922, A. F. Bridge read a paper on "The Load Problem for Gas Utilities" which set forth some of these considerations.

It was pointed out by Mr. Bridge that the constantly increasing heating load is bringing economic disadvantage to the gas utility, in that capital and operating items are requiring expenditures that are altogether disproportionate to the use which they receive. For example, in the case of the Los Angeles Gas and Electric Corporation it was offered that one-fourth of the entire invested capital was provided to meet peak demands calling for its use only three per cent of the time. During 97 per cent of the time this invested capital was idle. The annual load factor, based on peak hour demand, was only 22 per cent. This condition has necessitated a 67 per cent increase in the capital of Los Angeles gas companies, over a two-year period ending June 30, 1922.

Distributed storage is of value in solving this problem, in the experience of the Southern Counties Gas Company, since it minimizes the investment necessary to meet high and infrequent peak

demands, through improving the peak day load factor at several points in the system.

Another factor that had to be reckoned with relates to the source of the Company's gas supply. With natural gas from oil wells supplying its lines, any sudden increase in rate of delivery to the lines is impossible; hence some form of storage is indispensable. Development of high pressure storage is enabling the Company to meet the demand for increased transmission capacity, while avoiding prohibitive costs of compression station operation in the many small towns served.

Report Shows Merits of High Pressure Storage

A report on the gas storage requirements of the Southern Counties Gas Company, submitted by Mr. Bridge in July, 1925, just prior to the beginning of the high pressure storage holder construction program described in this article, formed the basis of an address delivered at the last sectional meeting of the Pacific Coast Gas Association, held in San Francisco on November 20. Mr. Bridge's remarks at the Associational meeting dealt with the "Economics of High Pressure Storage."

The report referred to above presents the economic superiority of high pressure storage from the standpoint of annual cost per unit of capacity; also, concentrated and distributed storage are contrasted, and comparison is made of the relative advantages of high pressure and low pressure storage.

In investigating various types of high pressure storage it was found that the compression tank type, either spherical or cylindrical with hemispherical ends, is cheaper for working pressures above approximately 30 pounds. The cylindrical hydraulic-displacement type is cheaper at lower pressures. Prices, according to the report, range from $97,700 to $134,000 per million of net capacity, on a minimum sendout pressure of five pounds. A maximum working tensile stress of 13,750 pounds per sq. in., corresponding to a safety factor of 4, served as a basis for the above quotations.

Other highlights of the report which attest the advantages of high pressure storage follow:

High pressure storage through location of holders at termini of lines means approximate doubling of hourly sendout capacity, since the peak hour is twice the average hourly sendout.

High pressure storage promotes dependability of service, as contrasted with concentrated storage, for storage within a district serves as a secondary source of supply, controllable and available within the district, when interruption of

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service or increase in load brings an emergency.

High pressure storage is logical in view of future developments. With a declining supply of natural gas the industrial load will decrease, while a growing domestic load remains centered in the present localities. Distributed high pressure storage at domestic centers will meet this condition.

Secondary transmission lines may be fed direct from storage, under the high pressure system, since part of the capacity of this type of storage is available at pressures exceeding the normal distribution pressure.

Superior to Low Pressure

Contrasted with low pressure, high pressure presents the following outstanding advantages:

There are no moving parts.

Action is automatic.

Sizes and dimensions of storage units are flexible, making possible the ready adaptation of units to holder sites.

No nuisance of noise or odor accompanies operation.

Natural gas is not required as fuel for operation. This is a problem of first importance in the face of a declining gas supply, and considering that the equivalent of 60 per cent of the present domestic sales of the Southern Counties Gas Company is now used for fuel at primary sources and booster stations.

Another highly important advantage inherent in high pressure distributed storage is that units may be provided when and where load and supply conditions dictate, thus escaping the incubus of fixed charges on unused capacity.

When a few months of experience with the operation of the 12 new units of the Southern Counties high pressure system has been had, some additional findings will be presented through the columns of *Western Gas*.

COOKING LESSONS DRAW WOMEN OF SALT LAKE CITY

A four-day series of lessons on modern cookery was recently conducted in the auditorium of the Utah Gas and Coke Company, Salt Lake City, Utah, by Miss Jean Shively, representing the home service department of the Tapper Stove Company. An aggregate attendance of 1522 was secured during the course, with a high water mark of 450 for single day's attendance. Contests of various kinds were held and prizes awarded winners.

L. B. BURKHART RESIGNS FROM LONG BEACH SUPERINTENDENCY

Resignation of H. W. Burkhart as chief engineer and superintendent of construction for the gas department, City of Long Beach, takes effect on December 1, Mr. Burkhart being succeeded by W. A. White, who was formerly commercial agent for the Gas department of Long Beach. Mr. Burkhart is at present engaged in furthering plans for gas service in the Imperial Valley, Calif.

Preventing Soil Corrosion *of* Underground Piping

(Continued from Page 26)

companies cover all of their underground pipe, regardless of soil conditions, for corrosion is so uncertain in the location and intensity of its attacks, that the extra cost of the covering—merely nominal, after all—is more than paid for in not "taking the chance." In confirmation of this it is cited that the Terra Bella and Lindsay-Strathmore Irrigation Districts in nine years of service have not replaced a single foot of covered pipe because of corrosion, though experience has shown the life of unprotected steel pipe of similar weight in the soil of those districts is only about five years.

10-INCH GAS LINE NEARING COMPLETION IN CALGARY

D. C. Howland of the Canadian Western Natural Gas, Light, Heat and Power Company, Ltd., Calgary, Alberta, in a recent letter to *Western Gas,* announces that a 10-inch natural gas line, approximately 30 miles in length, is being completed by the Company. The line will bring the gas from No. 4 Royalite well to Calgary, Alberta, and will duplicate the existing line which was found to be not sufficiently large to take care of the added production from the Turner Valley field.

Work on the erection of the scrubbing plant to clean this gas is almost completed and both the pipe line and scrubbing plant will be ready to meet the heavy demands of the winter load.

POPULARITY CONTEST MEANS GAS PUBLICITY IN PANAMA

In the Panama Times for October 10 appears a photograph of a young lady, extremely pleasing to the eye. She stands with one outstretched hand resting upon a modern gas range, a prize which she has selected as her award for winning third place in a newspaper popularity contest. The choice appears to be a good one, judging from the photograph, and certainly this brand of gas publicity is deserving of mention. *Western Gas* suspects that Paul Vecker, manager of the Panama-Colon Gas Company, had something to do with it.

COAST VALLEYS BOND ISSUE TO FINANCE BETTERMENTS

Coast Valleys Gas and Electric Company has been authorized by the Railroad Commission of California to issue and sell on or before December 31, 1926, $1,000,000.00 of its Series "B" seven per cent preferred stock, and to use the proceeds to reimburse its treasury and finance additions and betterments amounting to $760,606 in 1926.

VANCOUVER COMPANY SECURES TWO MAJOR ORDERS

The new business department of the British Columbia Electric Railway Company, operators of the Vancouver gas service, reports two recent gratifying bits of business. One, a $7,000 order for the Vancouver Motors, Ltd., local representatives for the Ford car, is the largest single contract ever sold by the gas department of the company. The new building of the Vancouver Motors, Ltd., will be equipped with 39 radiators, the "Improved" Vacuum System being selected for the heating unit. A block of stores, the first to be erected on the Provincial Government's property, University Hill, is the second important order, and is regarded as the forerunner of others in the same section.

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High Pressure Governors for Manufactured Gas

Performance in numerous installations prove that the Duplex Sensitive Governor excels all others in simplicity and accuracy.

These governors are especially adapted for the requirements of manufactured gas companies, where the high pressure transmission system is in use.

They will reduce a high and varying inlet pressure to a low and unvarying delivery pressure within a small fraction of an inch.

Constructed of materials resistent to the chemical action of manufactured gases; all frictional surfaces eliminated; and the diaphragm surface increased to secure the utmost delicacy of regulation.

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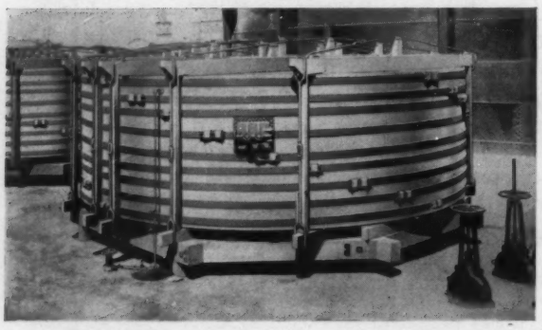

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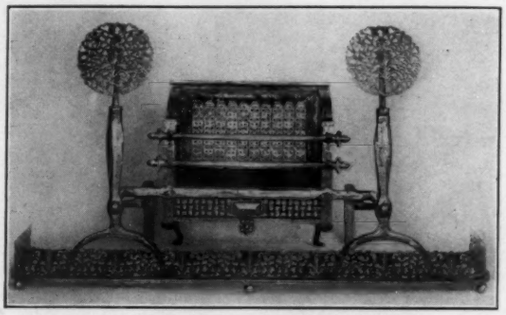
FENDERS—



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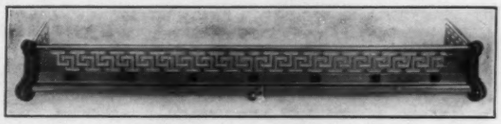

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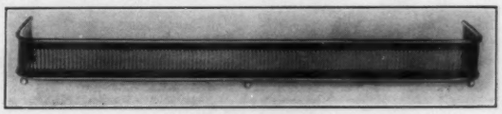

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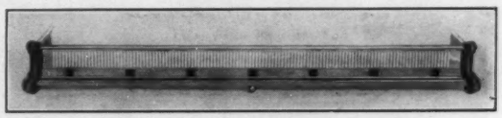

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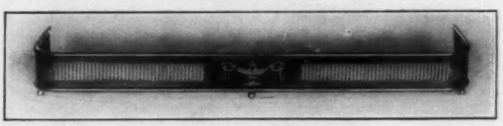

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